UNCCHARLOTTE

The University of North Carolina at Charlotte

Graduate Catalog 2005-2007

Vol. IV

Available electronically at: http://www.uncc.edu/gradmiss/gs_catalog.html

The University of North Carolina at Charlotte is open to people of all races, committed to equality of educational opportunity, and does not discriminate against applicants, students, or employees based on race, color, national origin, religion, sex, sexual orientation, age, or disability. Moreover UNC Charlotte actively seeks to promote integration by recruiting and enrolling a large number of ethnically diverse students.

ACADEMIC CALENDAR 2005-2007

Dates pertaining to changes in enrollment and refunds are included in the calendars that appear in the *Schedule of Classes* each semester and in the summer sessions bulletins.

	2005-06	2006-07
FALL SEMESTER		
Academic Year Begins	Aug 15	Aug 15
First Class Day	Aug 22	Aug 21
No Saturday Classes	Sept 3	Sept 2
Labor Day-University closed	Sept 5	Sept 4
Student Recess - no classes	Oct 10-11	Oct 9-10
Thanksgiving - no classes	Nov 23-26	Nov 22-25
University closed	Nov 24-25	Nov 23-24
Last Class Day	Dec 7	Dec 6
Reading Day	Dec 8	Dec 7
Final Examinations*	Dec 9-10, 12-16	Dec 8-9, 11-15
Commencement	Dec 17	Dec 16
SPRING SEMESTER		
First Class Day	Jan 9	Jan 8
M.L. King Day - University closed	Jan 16	Jan 15
Student Recess - no classes	Mar 6-11	Mar 5-10
Spring Weekend - no classes	Apr 14-15	Apr 6-7
Saturday Classes Final Exams	Apr 29	Apr 28
Last Class Day	May 2	May 1
Reading Day	May 3	May 2
Final Examinations*	May 4-5, 8-11	May 3-4, 7-10
Ceremony Day	May 12	May 11
Commencement	May 13	May 12
Academic Year Ends	May 14	May 14
FIRST SUMMER TERM		
Class Days Including Exams	May 22-June 28	May 21-June 27
Memorial Day – no classes	May 29	May 28
SECOND SUMMER TERM		
Class Days Including Exams	July 5-Aug 10	July 5-Aug 10
Fourth of July - University closed	July 4	July 4
EXTENDED SUMMER TERM		
Class Days Including Exams	May 22-Aug 10	May 21-Aug 10
Fourth of July - University closed	July 4	July 4

* *Common Examinations held on the first day of exams.*

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THE UNIVERSITY

HISTORY OF THE UNIVERSITY OF NORTH CAROLINA

In North Carolina, all public educational institutions that grant baccalaureate degrees are part of the University of North Carolina. The University of North Carolina at Charlotte is one of the 16 constituent institutions of the multi-campus state university.

The University of North Carolina, chartered by the N.C. General Assembly in 1789, was the first public University in the United States to open its doors and the only one to graduate students in the eighteenth century. The first class was admitted in Chapel Hill in 1795. For the next 136 years, the only campus of the University of North Carolina was at Chapel Hill.

In 1877, the N.C. General Assembly began sponsoring additional institutions of higher education, diverse in origin and purpose. Five were historically black institutions, and another was founded to educate American Indians. Several were created to prepare teachers for the public schools. Others had a technological emphasis. One is a training school for performing artists.

In 1931, the N.C. General Assembly redefined the University of North Carolina to include three state-supported institutions: the campus at Chapel Hill (now the University of North Carolina at Chapel Hill), North Carolina State College (now North Carolina State University at Raleigh), and Woman's College (now the University of North Carolina at Greensboro). The new multi-campus University operated with one board of trustees and one president. By 1969, three additional campuses had joined the University through legislative action: the University of North Carolina at Charlotte, the University of North Carolina at Asheville, and the University of North Carolina at Wilmington.

In 1971, the General Assembly passed legislation bringing into the University of North Carolina the state's ten remaining public senior institutions, each of which had until then been legally separate: Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina Agricultural and Technical State University, North Carolina Central University, the North Carolina School of the Arts, Pembroke State University (now the University of North Carolina at Pembroke), Western Carolina University, and Winston-Salem State University. This action created the current 16-campus University. (In 1985, the North Carolina School of Science and Mathematics, a residential high school for gifted students, was declared an affiliated school of the University.)

The UNC Board of Governors is the policy-making body legally charged with "the general determination, control, supervision, management, and governance of all affairs of the constituent institutions." It elects the president, who administers the University. The 32 voting members of the Board of Governors are elected by the General Assembly for four-year terms. Former board chairmen and board members who are former governors of North Carolina may continue to serve for limited periods as non-voting members emeriti. The president of the UNC Association of Student Governments, or that student's designee, is also a non-voting member.

Each of the 16 constituent institutions is headed by a chancellor, who is chosen by the Board of Governors on the president's nomination and is responsible to the president. Each institution has a board of trustees, consisting of eight members elected by the Board of Governors, four appointed by the governor, and the president of the student body, who serves ex-officio. (The NC School of the Arts has two additional ex-officio members.) Each board of trustees holds extensive powers over academic and other operations of its institution on delegation from the Board of Governors.

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

UNC Charlotte aspires to be North Carolina's most energetic and responsive university, offering unparalleled educational opportunities for nearly 25,000 students seeking the highest quality undergraduate, graduate, and continuing personal or professional enrichment in the liberal arts and sciences and selected professions. The goal of UNC Charlotte is to be a publicly supported Doctoral/Research University – Extensive in North Carolina early in the 21st Century. UNC Charlotte will be known especially for the individual commitment of each member of its collegial and diverse faculty and staff to extending educational opportunity and ensuring student learning and success, both at the graduate and undergraduate levels; its nationally and internationally recognized capacity for research and scholarship; and its willingness to join its resources in collaboration with those of other institutions to address the major educational, economic, social, and cultural needs of the greater Charlotte region. UNC Charlotte has a special responsibility to build the intellectual capital of this region.

The University offers programs in architecture, business, education, engineering, health professions, the humanities, information technology, physical and biological sciences, and social and behavioral sciences. In order to meet the growing need for higher education in the Charlotte region and in the State, the University

continues to expand degree programs and continuing education non degree offerings.

The University is committed to excellence through informed and effective teaching in all academic programs and emphasizes undergraduate instruction as the foundation of life-long learning and advanced formal education. The students selected for admission have demonstrated a willingness to learn, a capacity to benefit from a broad array of intellectual resources, and the potential to participate in the opportunities offered by the changing global society. University programs are open to all qualified students without regard to race, color, national origin, gender, age, religious belief, sexual orientation, or disability. Participation by students from other states and nations is welcomed.

The size and distinction of our research programs reflects the nationally competitive faculty. Recruited from across the world, they engage in both basic and applied research. Scholarly inquiry informs graduate and undergraduate instruction, and takes advantage of the University's location in a diverse and dynamic metropolitan region.

The campus environment encourages the active involvement of students in their personal and intellectual development, including opportunities to learn leadership skills. The policies and practices of the University are designed to graduate students with the breadth and depth of knowledge and the intellectual and professional skills that prepare them for a productive life in an ever-changing world. The University experience will:,

- Foster a realistic understanding of their personal potentials;
- Promote a commitment to responsible citizenship and a capacity to lead;
- Encourage strong ties and commitment to the University and its mission and vision;
- Develop fundamental skills of inquiry in writing, mathematical and logical reasoning, information literacy and technology, and the sciences
- Develop an understanding and appreciation of the themes of liberal education for private and public life in the areas of arts and society, the western tradition, global understanding, and ethical issues and cultural critique;
- Develop oral and written communication skills;
- Develop the ability to engage in reasoned debate about pressing moral concerns and to resolve them in an ethically sound and responsible manner.

Institutional Mission Statement

UNC Charlotte is the only Doctoral/Research University – Intensive in the Charlotte region, fully engaged in the discovery, dissemination, synthesis, and application of knowledge. It provides for the educational, economic, social, and cultural advancement of the people of North Carolina through on- and off-campus programs, continuing personal and professional education opportunities, research, and collaborative relationships with private, public, and nonprofit institutions. UNC Charlotte has a special responsibility to build the intellectual capital of this area. As such it serves the research and doctoral education needs of the greater Charlotte metropolitan region.

The primary commitment of UNC Charlotte is to extend educational opportunities and to ensure success for qualified students of diverse backgrounds through informed and effective teaching in the liberal arts and sciences and in selected professional programs offered through Colleges of Architecture, Arts and Sciences, Business Administration, Education, Engineering, Information Technology, and Health and Human Services, and through programs and services designed to support students' intellectual and personal development. The University offers an extensive array of baccalaureate and master's programs and a number of doctoral programs.

With a broad institutional commitment to liberal education as the foundation for constructive citizenship, professional practice, and lifelong learning, UNC Charlotte is prepared to focus interdisciplinary resources to address seven broad areas of concern to the Charlotte region: 1) Liberal Education; 2) Business and Finance; 3) Urban and Regional Development; 4) Children, Families, and Schools; 5) Health Care and Health Policy; 6) International Understanding and Involvement; and 7) Applied Sciences and Technologies.

Academic Structure

UNC Charlotte is organized into four administrative divisions: Academic Affairs, Business Affairs, Development and University Relations, and Student Affairs. The Division of Academic Affairs includes Enrollment Management; The Graduate School; Library; Information and Technology Services; Metropolitan Studies and Extended Academic Programs; International Programs; Research; the Charlotte Research Institute and seven colleges, the Colleges of Architecture, Arts and Sciences, Business Administration, Education, Engineering, Information Technology, and Health and Human Services. The colleges offer 83 undergraduate and 58 master's degree options and sixth year Certificates of Advanced Study, and 12 doctoral programs. Many of the departments throughout the University are involved in teacher education. The College of Education, advised by the University Teacher Education Committee, is responsible for these programs.

Equal Opportunity And Affirmative Action

The University of North Carolina at Charlotte recognizes a moral, economic, and legal responsibility to ensure equal employment opportunity for all persons, regardless of race, color, religion, gender (except when gender is a bona fide occupational qualification), sexual orientation, age, national origin, physical or mental disability (except when making reasonable accommodations for physical or mental disabilities that would impose undue hardship on the conduct of University business), or status as a disabled or Vietnam Era Veteran (except when making reasonable accommodations for physical or mental limitations of a person with such veteran status that would impose an undue hardship on the University). This policy is a fundamental necessity for the continued growth and development of this University. Nondiscriminatory consideration shall be afforded applicants and employees in all employment actions including recruiting, hiring, training, promotion, placement, transfer, layoff, leave of absence, and termination. All personnel actions pertaining to either academic or nonacademic positions to include such matters as compensation, benefits, transfers, layoffs, return from layoffs, University-sponsored training, education, tuition assistance, and social and recreational programs shall be administered according to the same principles of equal opportunity. Promotion and advancement decisions shall be made in accordance with the principles of equal opportunity, and the University shall, as a general policy, attempt to fill existing position vacancies from qualified persons already employed by the University. Outside applicants may be considered concurrently at the discretion of the selecting official. The University has established reporting and monitoring systems to ensure adherence to this policy of nondiscrimination.

Affirmative Action

Our philosophy concerning equal employment opportunity is affirmed and promoted in the University's Affirmative Action Plan. To facilitate UNC Charlotte's affirmative action efforts on behalf of disabled workers, disabled veterans and veterans of the Vietnam Era, individuals who qualify and wish to benefit from the Affirmative Action Plan are invited and encouraged to identify themselves. This information is provided voluntarily, and refusal of employees to identify themselves as veterans or disabled persons will not subject them to discharge or disciplinary action. Unless otherwise required by law, the information obtained will be kept confidential, except that supervisors and managers may be informed about restrictions on the work or duties of disabled persons and about necessary accommodations.

Discriminatory Personal Conduct. The University seeks to promote a fair, humane, and respectful environment for its faculty, staff, and students. To that end, University policy explicitly prohibits sexual harassment, racial harassment, and all other personal conduct which inappropriately asserts that sex, race, ethnicity, sexual orientation, disability, or ancestry are relevant to consideration of individual worth or individual performance. The same policies provide procedures for the informal or formal resolution of instances where such behavior is suspected or alleged. The policies have received wide distribution and are available for inspection in all administrative offices on campus.

Accreditation

UNC Charlotte is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia 30033-4097: telephone number 404-679-4501) to award baccalaureate, master's, intermediate, and doctoral degrees.

The Bachelor of Architecture and Master of Architecture "first professional degree" programs are accredited by the National Architectural Accrediting Board (NAAB). The Department of Chemistry is on the approval list of the American Chemical Society. The Master of Public Administration program is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA). The Bachelor of Social Work and Master of Social Work programs are accredited by the Council on Social Work Education (CSWE). The programs in business and accounting are accredited by AACSB International - The Association to Advance Collegiate Schools of Business. The University's professional education programs for BK-12 teachers, counselors, and administrators are approved by the North Carolina Department of Public Instruction (NCDPI) and accredited by the National Council for Accreditation of Teacher Education (NCATE). The School Counseling and Agency (Community) Counseling programs in Counselor Education are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The civil, computer, electrical, and mechanical engineering programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology; and the civil, electrical, and mechanical engineering technology programs are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: (410) 347-7700. The Nursing programs are accredited by the Commission on Collegiate Nursing Education (CCNE) and the BSN program is approved by the North Carolina Board of Nursing. The Nursing Anesthesia program is accredited by the Council on Accreditation of Nurse Anesthesia Educational Programs (CANAEP). The Bachelor of Athletic Training program is accredited by the Joint Review Committee on Educational Programs in Athletic Training (JRCAT) and Commission of Allied

Health Education Programs (CAAHEP) through October 2008. Both the Bachelor of Science in Health Fitness program and the Master of Science in Clinical Exercise Physiology are in candidacy for accreditation by the Committee on Accreditation for the Exercise Sciences (CoAES) and Commission of Allied Health Education Programs (CAAHEP). The Master of Health Administration Program is in candidacy for accreditation by the Commission on Accreditation of Healthcare Management Education (CAHME).

The University is a member of the Council of Graduate Schools, the Conference of Southern Graduate Schools, and The North Carolina Association of Colleges and Universities.

THE GRADUATE SCHOOL

Administration

Thomas L. Reynolds, *Associate Provost for Graduate Programs and Dean of the Graduate School*

Kent E. Curran, *Senior Associate Dean of the Graduate School*
Johnna W. Watson, *Associate Dean of the Graduate School*
Linda J. Dunatov, *Assistant Dean for Graduate Student Affairs*
Greet Provoost, *Assistant Dean for International Student Affairs*

Kenneth A. Lambla, *Dean,* College of Architecture
Nancy A. Gutierrez, *Dean,* College of Arts and Sciences
Claude C. Lilly III, *Dean,* Belk College of Business Administration
Mary Lynne Calhoun, *Dean,* College of Education
Robert E. Johnson, *Dean,* The William States Lee College of Engineering
Karen Schmaling, *Dean,* College of Health and Human Services
Mirsad Hadzikadic, *Dean,* College of Information Technology

History and Organization of the Graduate School

The University of North Carolina at Charlotte was established in 1965 by the North Carolina General Assembly, which transformed Charlotte College, with beginnings in 1946, into a campus of The University of North Carolina. The Graduate School was established in 1985 with the appointment of the first Dean of the Graduate School, although graduate degree programs had been offered since 1969. Today more than 700 members of the Graduate Faculty and more than 4,000 graduate students participate in a broad array of graduate programs at the master's and doctoral levels and in graduate certificate programs.

The executive and administrative affairs of the Graduate School are carried out by the Associate Provost for Graduate Programs and Dean of the Graduate School, who acts in cooperation with the deans of the seven colleges of Architecture, Arts and Sciences, Business Administration, Education, Engineering, Health and Human Services, and Information Technology.

The Graduate Council

The Graduate Council, whose voting members are elected by the Graduate Faculty, reviews, develops and makes recommendations concerning Graduate School policy. All curricular proposals and all criteria for membership on the Graduate Faculty come before the Graduate Council. In addition, the Graduate Council serves in an advisory capacity to the Dean of the Graduate School.

The Graduate Faculty

In accordance with criteria developed by each graduate program or unit and approved by the Graduate Council, the Dean of the Graduate School appoints members of the Graduate Faculty for renewable terms. Members of the Graduate Faculty offer courses and seminars, mentor graduate students, and supervise research at an advanced level of scholarship.

The Graduate Directors and Coordinators

Each graduate program, and in some cases certain program areas within a discipline, has either a Graduate Director or Coordinator. This individual is a member of the Graduate Faculty and is responsible for coordinating various functions of the departmental graduate program. Directors and Coordinators assist students with understanding program requirements (along with the student's specific advisor) and can answer program specific questions such as transfer credit, prerequisites, program specific admission requirements, etc.

GRADUATE PROGRAMS

Doctoral or Master's Degree Programs

UNC Charlotte offers 12 doctoral and 56 master's degree programs. To be admitted to a degree program, an applicant must meet all the requirements for admission, be recommended by the department in which he/she proposes to study and receive the approval of the Graduate School. Acceptance into one graduate program does not guarantee acceptance into any other program. Acceptance into each program must be recommended by the department or college offering the program and approved by the Graduate School.

Graduate Certificate Programs

Graduate certificate programs are mechanisms for students who wish to complete a coherent graduate program in a defined area in which they do not wish to pursue a degree. Students are admitted to a specific graduate certificate program and are advised by faculty in the unit offering the graduate certificate. Since the graduate certificate is not a degree, students may apply the credits earned in the certificate program toward a degree that they pursue either concomitant with pursuing a graduate certificate or after the certificate has been awarded.

Post-Baccalaureate Study

Applicants seeking to take courses beyond the baccalaureate degree for licensure, license renewal, for transfer to another institution, as prerequisites for

admission to a graduate degree program or for personal satisfaction may be admitted as post-baccalaureate students. A post-baccalaureate student who is subsequently admitted to full standing in a graduate degree program may, with the recommendation of his/her advisor and the approval of the Graduate School, apply a **maximum** of six graduate credit hours acceptably completed in the post-baccalaureate status toward a degree.

Post-Baccalaureate study is not available to international students on, or intending to be on, F-1 or J-1 student visa/status, except for those with a valid Employment Authorization Document participating in Post Program Completion Optional Practical Training (for F-1) or Academic Training (for J-1)

Readmission – All Students

Post-baccalaureate, graduate certificate and degree students whose enrollment is interrupted will remain eligible to register for two calendar years without having to reapply for admission to the University if they are in good standing and have not exceeded the six or eight-year limit for their academic program of study. After an absence of more than 24 months, the student must apply for readmission; acceptance is subject to department, program and Graduate School approval. Students whose enrollment is suspended or terminated for academic reasons should consult the description of the procedures outlined in the "Academic Standing" section of the *Catalog.*

Early-Entry to Graduate Programs

Exceptional undergraduate students at UNC Charlotte may be accepted into some master's programs and begin work toward a graduate degree before completion of the baccalaureate degree. In those programs offering this option, an applicant may be accepted at any time after completion of 75 or more hours, although it is expected that close to 90 hours will have been earned by the time the first graduate course is taken. These students will have provisional acceptance status, pending the award of the baccalaureate degree.

To be accepted in this program, an undergraduate student must have at least a 3.2 overall GPA and have taken the appropriate graduate standardized test and have earned an acceptable score. A given program may have more rigorous admissions criteria. If an early-entry student has not met the normal admission requirements of a 2.75 overall undergraduate GPA and a 3.0 junior-senior GPA at the end of his/her baccalaureate degree, she/he will be dismissed from the graduate program.

Students accepted into an early-entry program will be subject to the same policies that pertain to other matriculated graduate students. Generally, it will be assumed that early-entry students will finish their baccalaureate degrees before they complete 15 hours of graduate work. No courses taken before admission to the graduate program may be applied to a graduate degree.

Some early-entry programs are also accelerated. Under this model, ordinarily up to six hours earned at the graduate level may be substituted for required undergraduate hours. In other words, up to six hours of graduate work may be "double counted" toward both the baccalaureate and graduate degrees. Individual programs may allow additional hours at the graduate level to be substituted. In no case may more than 12 hours be double-counted.

Not all graduate programs have the early entry option. Inquiries should be addressed to the appropriate department or to the Graduate School.

GRADUATE STUDENT LIFE

New Graduate Student Orientation

The Graduate School conducts several University-wide orientation programs for new graduate and post-baccalaureate students during the course of the year. Information about the dates and times of these programs can be found on the Graduate School Website (http://www.uncc.edu/gradmiss/). Information on the fall semester programs is also sent, beginning in July, directly to new students admitted for the fall semester. All Graduate Assistants are ***required*** to attend a specific orientation program prior to the fall semester as part of their assistantship contract.

The orientation programs offer information about various University programs and services for graduate students; provide publications, including the *New Graduate Student Handbook*, to serve as resource guides for students; various content workshops on issues relevant to graduate education and graduate student life; and provide opportunities for students to ask specific questions.

Many of the individual graduate programs conduct discipline-specific orientation programs for their new graduate students. Degree students should contact their major department for information on programs that may be available. In addition, the International Student/Scholar Office (ISSO) conducts orientation sessions specifically designed for international graduate students.

Student Involvement

Students at UNC Charlotte are encouraged to participate in co-curricular activities. UNC Charlotte acknowledges that graduate students have many, many priorities in their lives. However, as with so many other aspects of one's life, active involvement enhances the experience.

Graduate and Professional Student Government
The Graduate and Professional Student Government (GPSG)) is the governing and primary organization for graduate students to present their needs to the University. The purpose of the Graduate and Professional Student Government (GPSG), according to the by-laws, is to serve as an appropriate voice on campus for graduate students, to meet the various needs of graduate students, and to establish a liaison between graduate faculty, graduate students, and the University. All graduate students are members of the GPSG.

In the spring of 1998, the Graduate Student Association successfully petitioned the student body through a referendum on the spring student body elections. The results of this referendum provided a significant change in the student body constitution and provided for the Graduate and Professional Student Government to become a separate governing body and representative organization for graduate students. In outlining the reasons for this separation, the GPSG cited the need for a GPSG office and the graduate student share of student activity fees to support: departmental graduate student associations, graduate student travel to read papers at academic conferences, and developing a Graduate Student Research Forum.

During the 1998-1999 academic year, GPSG began functioning as its own governing body. In the 1999-2000 academic year, the recognition of current (and new) graduate student organizations and the funding of these groups, including the GPSG, became the responsibility of the Graduate and Professional Student Government. Since the inception of the GPSG in its current structure, the availability of student activity fees to graduate students directly have increased dramatically. With this new governing structure, the GPSG has been very successful in advocating for and supporting graduate student needs. An annual Research Fair competition was begun in the spring of 2001 to showcase and reward excellence in graduate student research across all disciplines. GPSG continues to be active in new graduate student orientation, encouraging and recognizing graduate student organizations and increasing the amount of student activity fee support for graduate students. Each graduate program has the opportunity to be represented on the GPSG senate. More information about this opportunity can be obtained from the Assistant Dean for Graduate Student Affairs at 704-687-3375.

The GPSG Office is located in the Cone University Center, room 369I, (704) 687-3231. The GPSG Web address is: http://www.uncc.edu/gpsg.

Graduate Student Organizations
There are a number of graduate student organizations directly associated with academic programs. They include:

American College of Healthcare Executives
American Society of Precision Engineering
Association of Biology Graduate Students
Association of Chemistry Graduate Students
Association of Graduate Information Technology Students
English Graduate Student Association
Gamma Theta Upsilon (Geography)
Graduate Economics Student Society
Graduate History Association
Graduate Public Health Association
Graduate Public Policy Association
Graduate Social Work Association
Graduate Sociology Association
Graduate Student Nursing Organization
International Society for Optical Engineering
Masters of Architecture Student Society
Masters of Business Administration Association
Masters of Public Administration Student Group
Mathematics Graduate Student Association

Information on each group is available from the academic program department. Some groups have information available on the Student Life Website at: http://www.uncc.edu/cone/clubs/.

Please see additional information on the various programs, offices and services at UNC Charlotte in the "Programs, Services and Facilities" section in the back of this *Catalog*.

ADMISSION TO THE GRADUATE SCHOOL

Admissions Information

The University considers all applications without regard to race, color, sex, sexual orientation, national origin, disability, age or religion. All relevant factors are considered, with major emphasis being placed on the academic history of the applicant. The intent of the University is to offer admission to those applicants whose credentials indicate a strong likelihood of success in their selected curricula.

The University reserves the right to withhold or rescind the admission of an applicant who fails to meet any of the requirements for admission at the time of matriculation. Additionally, meeting the minimum admission requirements does not guarantee admission to a graduate program and the University reserves the right to restrict enrollments when necessary because of budgetary or other constraints.

Application Materials

A separate application and processing fee must be submitted for **each** graduate program of study for which a student applies. Requests for application materials and additional information about graduate programs should be directed to one of the following.

Applicants Should Contact
Office of Graduate Admissions
UNC Charlotte
9201 University City Boulevard
Charlotte, NC 28223-0001
Telephone: 704-687-3366
Fax: 704-687-3279
World Wide Web: http://www.uncc.edu/gradmiss
(International Students should also see : http://www.uncc.edu/intradmn)

E-Mail
For Domestic Applicants
E-mail: gradadm@email.uncc.edu

For International Applicants
E-mail: intlgradadm@email.uncc.edu

Application Deadlines

Students are encouraged to apply and to submit all supporting documents well in advance of the published deadlines. Some programs have earlier deadlines and may only admit to a particular term. Please contact the department offering the program to which you are applying for specific deadline information. The University may alter the date for acceptance of applications without further notice in accordance with available resources and the enrollment limitation established by the North Carolina General Assembly.

Term of Entry:	Application Should Be Completed By:
Fall	May 1
Spring	October 1
First or Second Summer Session	April 1

Application Processing

Applications of US Citizens, US Permanent Residents, Asylees and Refugees are processed as "domestic" applications. Applications of students on, or intending to be on, temporary visa/status in the USA (i.e. F-1, H-1, H-4 etc) as well as Pending Permanent Residents are processed as "international applications". Applicants should follow application instructions accordingly.

Application Processing Fee

A non-refundable $55 processing fee (drawn on a U.S. bank) must accompany **each** application that is submitted. Acceptable forms of payment are a personal check or a money order made payable to UNC Charlotte. Please make sure that your name is clearly noted on the check or the money order as the intended applicant. Applications received without the required fee will remain on file, unprocessed, in the Graduate School office for one year.

Application Status

Applicants will be notified once the application for admission has been received. Applicants can monitor the status of their applications via the Graduate Admissions Website: http://www.uncc.edu/gradmiss.

TYPES OF ADMISSION

(For Doctoral Degrees, Master's Degrees, and Graduate Certificates

Full Standing

Applicants who meet the general requirements for admission to graduate study plus any additional requirements specified by the college or department of academic concentration for the degree sought will be admitted to full standing.

Note:
Summer Session Entry Term Enrollment is generally available to international students already in the USA on a temporary visa status, including those who are attending UNC Charlotte or another institution of higher education in the USA on F-1/J-1 status prior to their intended enrollment in UNC Charlotte's Graduate School. Special conditions apply for initial entry F-1/J-1 visa/status holding international students. Please contact the Graduate School's Office of Admissions for further information.

Provisional Standing

Applicants to graduate programs who have not yet completed their undergraduate or masters degree will be provisionally admitted, pending the University's receipt of final transcripts (and/or diploma / degree certificates) indicating the award of the baccalaureate or masters degree. Students will have a maximum of one semester on provisional admission. Failure to produce the proper credentials during the first semester following provisional admission will result in a hold on registration.

Deferment Policy

An applicant who is admitted to a graduate program of study who fails to enroll for the term to which he/she has been admitted is presumed to have withdrawn his/her application. The application may be reinstated if the request to do so is received within one year from the originally requested term of entry. This request should be in writing and addressed to the Office of Graduate Admissions at least six weeks prior to the term in which the applicant seeks to register. Students are eligible to update an application for admission for one year from the original term of application. Applications and supporting documents for persons who are admitted to a graduate program but do not enroll are maintained on file for one year from the original term of application. Note that some programs require an applicant's credentials to be re-evaluated before deferring admission to a later term. International students on, or intending to be on, F-1 or J-1 visa status may be required to provide updated proof of legal status and financial resources.

Policy on Updating Applications

Applicants who do not submit their materials in time to be considered for admission to the requested term are expected to notify the Office of Graduate Admissions to request consideration for admission to a subsequent term. Students are eligible to update an application for admission to a subsequent term for one year from the original term of application. Incomplete applications (including test score reports) are maintained on file for one year from the original term of application. Supporting credentials received without an application will be maintained on file in the Office of Graduate Admissions for one year. All applications for persons who are not admitted are maintained on file for one year. Students whose admission to UNC Charlotte was denied may not update their application to a future term, but must reapply for admission i.e. submit a new application, application fee and supporting credentials/forms.

GENERAL APPLICATION REQUIREMENTS FOR ADMISSION

Doctoral Degree Programs

In order to be considered for admission to a doctoral program, an applicant must have a bachelor's degree (or its US equivalent) from a regionally accredited college or university. Some programs admit baccalaureate students directly to the doctoral program, while others require applicants to have earned a master's degree.

To be admitted after a master's program, an applicant should have earned an overall grade point average of at least 3.5 (on a 4.0 scale) in the graduate degree program. To be admitted after a bachelor's program, an applicant should have earned an overall GPA of at least 3.0, including a 3.0 for the last four semesters of his/her bachelor's degree.

The application package must include:

1) An application submitted to the Office of Graduate Admissions, accompanied by a $55 application fee, which is neither deductible nor refundable. Materials submitted in support of this application cannot be returned.
2) Two official transcripts of all academic work attempted beyond high school. Transfer credit posted on the records of other institutions is unacceptable and official transcripts of these credits must be supplied.
3) Official agency reports of satisfactory test scores as specified in the section on graduate programs in this *Catalog*. GRE/GMAT scores are reportable from ETS for a period of five years from the date of the exam. Therefore, GRE/GMAT scores more than five years old are not accepted since they cannot be officially reported. Likewise, MAT scores more than five years old are not accepted. For additional information regarding test score requirements, please see the Test Information section of this Catalog.
4) At least three evaluations from persons familiar with the applicant's personal and professional qualifications.
5) An essay (Statement of Purpose) describing the applicant's experience and objective in undertaking graduate study (Note: Some academic programs have specific items for the applicant to address in the Statement of Purpose; please contact the Office of Graduate Admissions or the academic department for specific requirements).
6) Submission of official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution. Required is either a minimum score of 557 on the paper-based TOEFL, a minimum score of 220 on the computer based TOEFL, a minimum score of 83 on the Internet based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum overall bandscore of 6.5 on the IELTS. Applicants who are citizens of, or who have received an associate's degree or higher in one of the following countries, are exempt from the English language proficiency requirement: Australia, British Caribbean and British West Indies, Canada (except Quebec), Ireland, Liberia, New Zealand, United Kingdom, and United States.

International Students should see the *Additional Admission Requirements for International Applicants* section of the *Catalog* for additional requirements.

Note:
Applicants with records of high quality who do not fulfill these requirements should discuss with the graduate program coordinator other factors that may have a bearing on admission. Some programs have higher standards or additional admission requirements. Additionally, there may be prerequisites for certain doctoral programs. Students should consult the graduate coordinator for the doctoral program to identify prerequisites. A separate application for admission is required for each graduate, post-baccalaureate, and certificate program of study at UNC Charlotte.

Master's Degree Programs

The applicant must possess a bachelor's degree, or its US equivalent, from a regionally accredited college or university, and must have attained an overall grade point average of at least 2.75 (based on a 4.0 scale) on all of the applicant's previous work beyond high school. The average for the junior and senior years must be a 3.0 or better. If the applicant has earned a post-baccalaureate

degree, grades in that program will be taken into consideration.

The application package must include:

1) Application submitted to the Office of Graduate Admissions, accompanied by a $55 application fee, which is neither deductible nor refundable. Materials submitted in support of this application cannot be returned.
2) Two official transcripts of all previous academic work attempted beyond high school. Transfer credit posted on the records of other institutions is unacceptable and official transcripts of these credits must be supplied.
3) Official agency reports of satisfactory test scores as specified in the section on graduate programs in this *Catalog*. GRE/GMAT scores are reportable from ETS for a period of five years from the date of the exam. Therefore, GRE/GMAT scores more than five years old are not accepted since they cannot be officially reported. Likewise, MAT scores more than five years old are not accepted. For additional information regarding test score requirements, please see the Test Information section of this Catalog.
4) At least three evaluations from persons familiar with the applicant's personal and professional qualifications.
5) An essay (Statement of Purpose) describing the applicant's experience and objective in undertaking graduate study. (Note: Some academic programs have specific items for the applicant to address in the Statement of Purpose; please contact the Office of Graduate Admissions or the academic department for specific requirements).
6) Submission of official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Batter (MELAB) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution. Required is either a minimum score of 557 on the paperbased TOEFL, a minimum score of 220 on the computer based TOEFL, a minimum score of 83 on the Internet based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum overall bandscore of 6.5 on the IELTS. Applicants who are citizens of, or who have received an associate's degree or higher in one of the following countries, are exempt from the English language proficiency requirement: Australia, British Caribbean and British West Indies, Canada (except Quebec), Ireland, Liberia, New Zealand, United Kingdom, and United States.

International Students should see the Additional Admission Requirements for International Applicants section of the *Catalog* for additional requirements.

Note:
Acceptance into each program must be approved by the department or college offering the program and by the Graduate School. Meeting minimum requirements for admission does not guarantee acceptance into a program. There may be prerequisites for certain master's programs. Students should consult the coordinator for the master's program to identify prerequisites. A separate application for admission is required for each graduate, post-baccalaureate, and certificate program of study at UNC Charlotte.

Graduate Certificate Programs

The applicant must possess a bachelor's degree, or its equivalent, from a regionally accredited college or university.

The application package must include:

1) An application submitted to the Office of Graduate Admissions, accompanied by a $55 application fee, which is neither deductible nor refundable.
2) An overall grade point average of at least 2.75 (based on a 4.0 scale) on all of the applicant's previous work beyond high school. The average for the junior and senior years must be a 3.0 or better. If the applicant has earned a post-baccalaureate degree (i.e. master's, doctoral), grades in that program will be taken into consideration.
3) Two official transcripts from each institution where academic work was attempted beyond high school.
4) Submission of official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution. Required is either a minimum score of 557 on the paperbased TOEFL, a minimum score of 220 on the computer based TOEFL, a minimum score of 83 on the Internet based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum overall bandscore of 6.5 on the IELTS. Applicants who are citizens of, or who have received an associate's degree or higher in one of the following countries, are exempt from the English language proficiency requirement: Australia, British Caribbean and British West Indies, Canada (except Quebec), Ireland, Liberia, New Zealand, United Kingdom, and United States.

Some programs may also require:

Standardized test scores, a personal statement (Statement of Purpose) outlining why the applicant seeks admission to the program, and additional admission requirements as specified in program descriptions.

Note:
There may be prerequisites for a graduate certificate program. Students should consult the coordinator for the

graduate certificate program to identify prerequisites. Admission to a graduate certificate program does not ensure admission into a graduate degree program. A separate application for admission is required for each graduate, post-baccalaureate, and certificate program of study at UNC Charlotte.

International Students should see the "Additional Admission Requirements for International Applicants" section of the *Catalog* for additional requirements.

Post-Baccalaureate Study

The applicant must possess a bachelor's degree, or its US equivalent, from a regionally accredited college or university. The application consists of a completed application form submitted to the Office of Graduate Admissions, accompanied by a $55 application fee which is neither deductible nor refundable.

Note:
A separate application for admission is required for each graduate, post-baccalaureate, and certificate program of study at UNC Charlotte. ***A post-baccalaureate student who subsequently applies and is admitted to a degree program may, with the permission of his/her advisor and the Graduate School, apply a maximum of six credit hours acceptably completed in the post-baccalaureate status toward a degree.*** Post-Baccalaureate study is not available to international students on, or intending to be on, F-1 or J-1 student visa/status, except for those with a valid Employment Authorization Document participating in Post Program Completion Optional Practical Training (for F-1) or Academic Training (for J-1)

Additional Admission Requirements for all International Applicants

1) Submission of official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB) or the International English Language Testing System (IELTS). Required is either a minimum score of 557 on the paper-based TOEFL, a minimum score of 220 on the computer based TOEFL, a minimum score of 83 on the Internet based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum overall bandscore of 6.5 on the IELTS. Applicants who are citizens of, or who have received an associate's degree or higher in one of the following countries, are exempt from the English language proficiency requirement: Australia, British Caribbean and British West Indies, Canada (except Quebec), Ireland, Liberia, New Zealand, United Kingdom, and United States.
2) Submission of the Immigration Status Form – Page 1.

Additional Enrollment Requirements for International Applicants on, or Intending to be on, F-1 or J-1 Visa Status

1) Statement of Financial Responsibility, to be completed by the applicant, indicating his/her sources of funds and understanding of the cost of study and stay at UNC Charlotte. .
2) Affidavit of Financial Support, to be completed by the applicant's sponsor, indicating that sufficient funds are available through the sponsor to cover the applicant's cost of study and stay at UNC Charlotte.
3) Supporting bank letter/statement: in the sponsor's name indicating the amount of funds available.
4) International Students on F-1 or J-1 status, transferring to UNC Charlotte from an institution of higher education within the USA must submit the Immigration Status Form – Page 2.

Students who are awarded financial aid by UNC Charlotte may subtract the amount of the financial aid from the required proof of financial resources as listed above.

Note:
All applicants submitting transcripts and degree certificates from non-U.S. educational institutions should note that bachelor's degrees awarded by non-U.S. schools may or may not be considered equivalent to the U.S. bachelor's degree. Recipients of degrees who are not at least equivalent to a U.S. bachelor's degree are not eligible for graduate study at UNC Charlotte.

Form I-20, for students on, or intending to be on, F-1 visa status, will not be issued until the applicant has been admitted to a degree program, proof of sufficient funds has been reviewed and approved, immigration status has been verified and financial responsibility has been proven.

Test Information

Applicants should have their test scores sent directly from the testing agency to the Office of Graduate Admissions (not to the department in which they wish to study). **For GRE, GMAT and TOEFL, UNC Charlotte's institution code is 5105. For MAT, UNC Charlotte's institution code is 1370.**

A student who has already earned a Ph.D., M.D., or J.D. from a US institution will not be required by the Graduate School to take a standardized test. The Graduate Coordinator/Director of a program, however, has the right to request that the student take a test and submit official scores. This does not apply to the TOEFL.

A student who has already earned a Master's degree will not be required by the Graduate School to retake a standardized test **IF** the student can demonstrate that he or she has completed the test in the past. The Graduate School will accept the student's copy of the official test scores (a photocopy is not acceptable) or an official

university transcript which prints the scores or a letter on official university letterhead attesting to the scores. The Graduate Coordinator/Director, however, has the right to request that the student re-take the test and submit official scores. This does not apply to the TOEFL.

A student who has taken the GRE, GMAT or MAT but has not earned a degree must be able to submit official scores that are not over five years old. If the student has not taken the test within five years, he or she must re-take the test.

Graduate Record Examination (GRE))
Sylvan Learning Systems, Inc., administers the computer-adaptive GRE at Sylvan Technology Centers several times per week throughout the U.S. Please call your local Sylvan Technology Center to schedule a test. GRE Subject tests are also offered at Davidson College (704-892-2000). To obtain additional information about the GRE, visit the GRE Website at http://www.gre.org or call 1-800-GRE-CALL.

Miller Analogies Test (MAT)
The Psychological Testing Corporation administers the MAT. To schedule a test, please call 1-800-228-0752. The Counseling Center at UNC Charlotte at 704-877-2105 also administers the MAT.

Graduate Management Admission Test (GMAT))
Sylvan Learning Systems, Inc., administers the computer-adaptive GMAT at Sylvan Technology Centers several times per week throughout the U.S. Please call your local Sylvan Technology Center to schedule a test. To obtain additional information about the GMAT, visit the GMAT Website at http://www.gmat.org or call 1-800-GMAT-NOW.

Test of English as a Foreign Language (TOEFL))
The TOEFL is offered at the Prometric Testing Center. Please call your local Prometric Testing Center to schedule a test (in Charlotte, call (704)364-8745). To obtain additional information about the TOEFL, visit the TOEFL Website at http://www.toefl.org.

Michigan English Language Assessment Battery (MELAB))
The MELAB assesses Advanced level English language competence of adult non-native speakers of English, and scores on this battery may be submitted in lieu of TOEFL or IELTS scores. For further information, visit http://www.lsa.umich.edu/eli/melab.htm

International English Language Testing System (IELTS))
The IELTS assesses the complete range of English language skills which students studying in English commonly encounter. For further information, visit http://www.ielts.org

FINANCIAL INFORMATION

STUDENT EXPENSES AND FEE PAYMENT

Charges for tuition and fees vary according to the student's status as a resident or nonresident of North Carolina. A nonresident student pays a higher rate of tuition than a legal resident.

The University reserves the right, with the approval of proper authorities, to make changes in tuition and fees at any time. The University also reserves the right to correct any clerical errors on a student's account.

Student Expenses

Graduate students taking nine or more semester hours and undergraduate students taking 12 or more semester hours during a regular semester will be charged full tuition and fees. Students taking fewer than the nine hours for graduate study and 12 hours for undergraduate study will be charged a prorated portion of tuition and fees as specified in the fee schedules in this *Catalog*.

Fee Payment

Tuition and fees are due and payable by the date specified on the bill. Advance registration billing and due dates of fees vary with the term. Checks and money orders should be made payable to UNC Charlotte. Visa and MasterCard are accepted. Payments by credit card may be made online through 49er Express/Self-Service. UNC Charlotte offers an installment payment option through AMS Tuition Pay. For information, please contact AMS at 1-800-635-0120 or online at www.tuitionpay.com.

Returned Check Policy

If a check is returned by the bank, a letter is sent to the maker indicating that a penalty of $25.00 has been assessed and the account must be settled within 10 working days or the check will be considered to be a bad check and be processed accordingly. A hold will be placed on the student's record until the bad check is covered and the penalty is paid.

A student who pays a previous balance with a check in order to have a registration hold flag lifted will have their registration cancelled if the check is returned by the bank for any reason.

Residence Status For Tuition Purposes

Tuition charges are based upon classification of a student as a resident or a nonresident of North Carolina for tuition purposes. UNC Charlotte shall determine whether a student is a resident or a nonresident for tuition purposes in accordance with North Carolina General Statutes that are summarized below. A more complete explanation of the statute and the procedures are contained in A Manual to Assist the Public Higher Education Institutions of North Carolina in the Matter of Student Residence Classification for Tuition Purposes. Copies of the Manual are available for inspection in the Library and the admitting offices.

Residence. Generally, in order to qualify as a resident for tuition purposes, a person must be a legal resident of North Carolina AND must have been domiciled in North Carolina for at least twelve (12) months immediately prior to classification as a resident for tuition purposes. In order to be eligible for such classification, the person must establish that his or her presence in the state during such twelve-month period was for purposes of maintaining a bona fide domicile rather than for purposes of mere temporary residence incident to enrollment in an institution of higher education. Legal residence is accomplished by maintaining a bona fide domicile of indefinite duration as opposed to maintaining a mere temporary residence incident to enrollment at an institution of higher education. *Initiative and Proof of Status.* A student is responsible for seeking classification as a resident for tuition purposes. A student must (1) provide all of the information UNC Charlotte requires for consideration of residence classification and (2) establish facts that justify classification as a resident for tuition purposes.

Parents' Domicile. If a dependent student has living parents(s) or a court-appointed guardian who maintain bona fide domicile in North Carolina, this fact shall be prima facie evidence that the student is also domiciled in North Carolina. **This primary proof of the student's legal residence may be supported or rebutted by other information.**

If a student's parent(s) or guardian are domiciled outside of North Carolina, this fact shall be prima facie evidence that the student is also not domiciled in North Carolina, unless the student has lived in North Carolina for the five years preceding enrollment or re-registration at UNC Charlotte.

Effect of Marriage. A person does not automatically obtain North Carolina domicile solely by marrying a North Carolina resident. If both spouses have established a NC domicile, and one spouse has been a domiciliary longer than the other, the member of the couple who has the shorter duration of domicile may borrow his or her spouse's duration of domicile to meet the 12 months maintenance requirement. However, the two durations cannot be added together to meet the requirement.

Teacher Tuition Benefit. According to North Carolina General Statue 116-143.5, public school teachers and other personnel paid on the North Carolina teacher salary schedule who have established a legal residence (domicile) in North Carolina, but have maintained the domicile for less than twelve months, may be eligible to receive a waiver of the tuition difference between out-of-state and in-state tuition for courses relevant to teacher licensure or professional development as a teacher. If you believe you are eligible for this benefit, you must complete the entire North Carolina Residence and Tuition Status Application and provide supporting documentation for each semester that you wish to be considered for this benefit

Military Personnel. A North Carolinian who serves outside the State in the armed forces does not lose North Carolina domicile and thus North Carolina legal residence simply by reason of such service. Students in the military may prove retention or establishment of legal residence by reference to residentiary acts accompanied by residentiary intent.

In addition, North Carolina General Statutes provide tuition rate benefits to certain military personnel and their dependents who do not otherwise qualify for the in-state tuition rate. Members of the armed services, while stationed in and concurrently living in North Carolina, may be charged a tuition rate lower than the out-of-state tuition rate to the extent that the total of entitlements for applicable tuition costs available from the federal government, plus certain amounts calculated by reference to a North Carolina statutory formula, is a sum less than the out-of-state tuition rate for the applicable enrollment.

A dependent relative of a service member stationed in North Carolina shall be charged the in-state tuition rate while the dependent relative is living in North Carolina with the service member. Under this provision, the dependent relative must comply with any applicable requirements of the Selective Service System.

Tuition benefits based on military service may be enjoyed only if requirements for admission to UNC Charlotte have been met. The military service tuition statute does not qualify a person for or provide the basis for receiving derivative benefits under other tuition statutes.

Non-United States Citizens. If you are not a U.S. citizen, you may or may not qualify for resident tuition status on the same basis as a U.S. citizen; it depends upon the type of immigration or legal documents you hold. You may qualify if you are a permanent resident alien, a refugee, a parolee, or an asylee. You do not qualify if you hold one of the following visa or status - - B, C, D, F, J, M, P, Q, S.

If you later receive permanent resident alien status or a visa/status that allows you to qualify for resident tuition status, you must establish North Carolina domicile and wait 12 months. If you have applied for permanent resident alien status, but it has not been granted yet, you are still considered as being in the country under the visa or document that you had before you applied for permanent resident status (aka "green card").

Grace Period. If a student (1) is a legal resident of North Carolina, (2) has consequently been classified a resident for tuition purposes, and (3) has subsequently lost North Carolina legal residence while enrolled at UNC Charlotte, the student may continue to enjoy the in-state tuition rate for a grace period of 12 months measured from the date the student lost his or her status as a legal resident. If the 12 month grace period ends during an academic term in which the student is enrolled at UNC Charlotte, the grace period extends to the end of that term. Marriage to one domiciled outside of North Carolina does not, by itself, cause loss of legal residence, marking the beginning of the grace period.

Lost but Regained Legal Residence. If a student ceases enrollment at or graduates from UNC Charlotte while classified as a resident for tuition purposes and then abandons and reestablishes North Carolina legal residence within a 12-month period, that student shall be permitted to re-enroll at UNC Charlotte as a resident for tuition purposes without meeting the 12-month durational requirement. Under this provision, the student maintains the reestablished legal residence through the beginning of the academic term for which in-state tuition status is sought. A student may receive the benefit of this provision only once.

Change of Status. A student accepted for initial enrollment at UNC Charlotte or permitted to re-enroll following an absence from the institutional program that involved a formal withdrawal from enrollment will be classified by the admitting institution either as a resident or as a nonresident for tuition purposes prior to actual enrollment. A residence status classification once assigned (and finalized pursuant to any appeal properly taken) may be changed thereafter (with corresponding change in billing rates) only at intervals corresponding with the established primary divisions of the academic year.

Transfer Students. When a student transfers from one institution of higher education to another, he or she is treated as a new student and must be assigned an initial residence classification for tuition purposes.

Appeal Procedure. A newly admitted student or continuing student who has been classified as a non-resident for tuition purposes by the Graduate School may appeal the decision to the Graduate Residency Appeals Committee. This request must be in writing to the UNC Charlotte Graduate Residency Coordinator and must be submitted within ten days from the date of the issuance of the letter of determination. The request may consist simply of the statement, "I wish to appeal the decision as to my residence classification for tuition purposes." It must be dated and signed and should indicate the

applicant's UNC Charlotte student identification number and mailing address. If the Graduate Residency Appeals Committee determines that you are not a resident for tuition purposes, you may appeal that decision to the University of North Carolina: Office of the President.

TUITION AND FEES PER SEMESTER

The University reserves the right, with the approval of the appropriate authorities, to make changes in tuition and/or fees at any time. Tuition and fee rates for the 2005-2007 time period were not available at the time this Catalog was printed. The following tuition and fee rates and special fees are the rates charged for the Spring 2005 term.

GRADUATE RATES		
	Resident	**Non-Resident**
1 Hr. (Graduate Residency Credit only)	$108.00	$608.50
1-2 Hrs.	$476.40	$1,752.40
3-5 Hrs.	$751.90	$3,303.65
6-8 Hrs.	$1,205.75	$5,033.50
9 or more Hrs.	$1,776.00	$6,879.50

GRADUATE RATES (MBA Students)		
	Resident	**Non-Resident**
1 Hr. (Graduate Residency Credit only)	$108.00	$608.50
1-2 Hrs.	$788.90	$2,064.90
3-5 Hrs.	$1,376.90	$3,928.65
6-8 Hrs.	$2,143.25	$5,971.00
9 or more Hrs.	$3,026.00	$8,129.50

International students on, or intending to be on, F-1 or J-1 visa status are required, by immigration regulations, to provide proof of sufficient funds to cover the cost of tuition, fees, housing and other expenses , whether by personal, sponsor's or institutional funds, before Form I-20 may be issued. Additional information is available at the Office of Graduate Admissions.

Post baccalaureate students who are taking only undergraduate courses will pay tuition and fees at the undergraduate rate. Post baccalaureate students taking one or more graduate credit courses will pay tuition and fees at the graduate rate for all courses. (**Note:** This policy is presently under review. It is probable that beginning with the Fall 2006 semester, post baccalaureate students will pay tuition and fees at the graduate rate for all courses.)

The following Student Activities Fees are included in the **full-time** tuition and fee amounts. Fees per semester are:

Educational and Technology $76.00
Student Activity Facility 65.00
Student Activity Center Operations 65.50
Cone Center Facilities 14.00
Cone Center Operations 64.00
Student Activity Fee 24.50
Student Union Facility 37.50
Physical Education Facilities Maintenance 6.50
Physical Education Facility 6.50
Health Center Services 64.00
Health Center Facility 12.50
Athletic 182.50
Intramural 19.00
Student Union Planning Fee 7.50
Association of Student Governments 0.50
Administrative Computing 26.50
Student I.D. 2.00
Total fees per full-time student, per semester $674.00

Housing Per Semester

Shared Residence Hall space is **not** available to married students and/or their family members. There are apartments for non-married graduate students on campus. The following are **2004-2005** prices and plans and are subject to change for subsequent years.

Apartment ..... $1,722.00 to $2,052.00
Residence Hall -- Double Room $1,362.00
Residence Hall -- Single Room (if available) $2,018.00
Suite ..... $1,642.00 to $2,042.00

Dining Services Per Semester

The following **2005-2007** prices and plans are subject to change.

14 meals per week with $200
declining balance $1,335.00
12 meals per week with $300
declining balance $1,445.00
10 meals per week with $400
declining balance $1,445.00
150 block plan with $100
declining balance $1,155.00

Upper-classmen living in housing areas that require purchase of a meal plan may select one of the plans listed above or one of the following:
Declining Balance Account ..... $915.00 or $1,290.00
125 block plan with $175 declining balance $1100.00

Students living in apartments may select the following meal plan or any of those above:
Declining balance account $500.00

Commuters or UNC Charlotte apartment residents may purchase any of the plans listed above.

Any student, faculty or staff member may purchase or add additional Optional Dining Account funds to their 49er ID card. Optional Dining Accounts can be purchased from the 49er Card Office, located in the Auxiliary Services Building or in the ID/Dining Services Office, located in the Cone University Center, or at web site www.auxiliary.uncc.edu. New Optional Dining Accounts require no minimum purchase and may be paid by cash, check, or charged to Visa or MasterCard.

Special Assessments

During 2004-05, the following special assessments were charged to cover the cost of supplies or special materials (per semester, except where indicated otherwise):

Scuba Diving (KNES 2219).....$60.00
Advanced Scuba Diving (KNES 2220).....$35.00
Applied Music Fee (1 credit hour).....$45.00
Applied Music Fee (2 credit hours).....$90.00
College of Engineering Student Fee
1-7 hours (per academic year).....$76.00
8 hours or more (per academic year)..... $150.00
College of Information Technology student fee
1-7 hours (per academic year).....$76.00
8 hours or more (per academic year)..... $150.00
Teacher Licensure Fee.....$30.00
Experiential Education Fee.....$60.00
Architecture Major General Student Fee
(per academic year).....$80.00
International Student Fee (per academic year)... $100.00
Administrative Cancellation Fee $75.00

Application Fee. A $55 application fee must be submitted with the application for admission. The fee is not deductible and is not refundable.

Housing Deposit. Admission to UNC Charlotte does not guarantee residence hall space. Arrangements for on campus housing are made, after admission, with the Director of Housing and Residence Life. Residence Hall space is not available to families or children of enrolled students.

A $100 deposit must be submitted with all housing contracts. The deposit is not applied toward payment of fees. It is refunded only after the student has left on-campus housing and only if the student has met all financial obligations to the University. In the case of contract cancellation, the date of receipt of the written request for cancellation will determine, in part, the student's financial obligation to the University (please see the Housing Contract for the current academic year for specific cancellation dates).

Student Activities Fee. A part of the general fee provides students with a program of cultural, recreational, and entertainment activities. It pays for admission to many athletic contests, dramatic productions, activities sponsored by the University Program Board, social and entertainment functions, and for subscriptions to the campus newspaper and literary magazine.

Graduation Fee. Each member of the graduating class must pay a graduation fee of $35 at the time he/she applies for the degree. This fee includes the cost of the diploma and the cap and gown. No reduction of the fee is allowed for those receiving degrees *in Absentia.* (**Note:** This fee is subject to change. Please see the Graduate School Website for the most recent graduation fee.)

Credit By Examination Fee. Fees for credit by examination are as follows: A written examination for a course will require a fee of $15. A laboratory examination requiring the arrangement of such things as laboratory materials will require a fee of $25. A combination of a laboratory and written examination will require a fee of $30.

Motor Vehicle Registration Fees

Students attending UNC Charlotte are required to register their motor vehicle(s) in order to park on campus; there is no free parking. Vehicle registration for fall and spring semesters begins two weeks prior to the first day of classes. Students may request parking permits to be mailed directly to them (fall term only) by contacting Parking Services at least one month prior to the beginning of classes (704-687-4285). Payment must be received before the permit is mailed. **Permits are required at 8:00 a.m. the first day of class.** Two categories of permits are issued: Resident (for students living on campus) and Commuter (for students living off campus).

Permits sold in August are good for one year. Students who graduate in December may return their parking permit for a partial refund. The price of the permit is the same for faculty, staff and students. Please reference the web at www.uncc.edu/parking for current fees. Parking Services receives no state funding; therefore, parking fees are used to defray construction and operating expenses.

Night permits, valid only after 3:00 p.m., are sold at a reduced rate using the same schedule as the regular student permits. Students with night permits who come on campus before that time must park and pay at the meters or in visitors' spaces.

Penalties for Parking Violations. Violators of University parking regulations are subject to monetary penalties ranging from $5 to $100, depending on the severity of the violation. Copies of parking regulations are distributed with the parking permit. If a citation is not paid or appealed within 10 days, the penalty will be applied to the student's account with the University. Subsequent registration may be withheld for non-payment. Parking citations are issued 24 hours a day. Decals and meters are enforced from 8:00 a.m. until midnight, Monday through Thursday and from 8:00 a.m. until 3:00 p.m. on Friday.

Questions concerning parking on campus should be directed to Parking Services, which is open from 8:00 a.m. until 5:00 p.m. Monday through Friday. Emergency situations and questions at other times should be directed to 704-687-2200.

Refunds

Tuition and Fees Refunds
A student who officially withdraws from the University in the fall or spring semester will receive a refund as follows:

Fall or Spring Semester	% of Tuition and Fees Refunded
Before 1st Class Day	100%
Week 1	100% minus $25 withdrawal fee
Week 2	100% minus $75 withdrawal fee
Week 3	80%
Week 4	75%
Week 5	70%
Week 6	60%
Week 7	55%
Week 8	50%
Week 9	40%
After Week 9	0%

Summer School. Summer School refund schedules are reviewed and revised annually based upon the Summer School calendar. See www.summer.uncc.edu for the refund schedule for the current sessions.

Exceptions: Charges are refundable by administrative action on a prorated basis for the unexpired portion of the term for the following reasons: death of the student, withdrawal for adequate medical reason as certified by the University Student Health Center or family doctor, death in the immediate family that necessitates student withdrawal, and dismissal or suspension from school. Immediate family is defined as wife, husband, parent, child, brother, sister, grandparent, and grandchildren and includes step-, half-, and in-law relationships. Appropriate documentation must be submitted to the Dean of Students.

No refunds will be given to students who are withdrawn by administrative action for failure to comply with the North Carolina immunization laws.

Housing Refunds
The contract period for academic-year contracts is the entire academic year (Fall and Spring semesters). The student and/or guarantor agree to pay the full amount of charges for residential services. To cancel residential services, the student and/or guarantor must send a signed written request for cancellation of the contract. The date of receipt of the written request for cancellation will determine, in part, the student's financial obligation to the University (please see the Housing Contract for the current academic year for specific cancellation dates). If, during the time of the Contract, the student loses the right to live in University housing by reason of disciplinary action, or breach of the Contract, no refund of housing charges for the term will be made.

Summer School: The contract period for Summer School coincides with each term of the Summer School calendar; housing charges are refundable based upon the number of weeks of occupancy.

Appeal Procedure
Appeals about tuition and dining refunds should be submitted in writing to Student Accounts, UNC Charlotte, Charlotte, NC 28223. Appeals about housing refunds should be submitted to Department of Housing, UNC Charlotte, Charlotte, NC 28223. Appeals are heard on a monthly schedule by the Tuition, Housing, and Dining Appeal Committee.

FINANCIAL AID

UNC Charlotte administers financial aid without regard to race, color, national origin, religion, sex, sexual orientation, age, or disability.

The University offers a comprehensive program of student financial aid (scholarships, fellowships, grants, loans, and part-time employment) to assist both graduate and undergraduate students in meeting educational expenses. Reasonable educational expenses include tuition and fees, room and board, books, supplies, transportation, miscellaneous personal expenses, and expenses related to maintenance of a student's dependents.

Eligibility

The programs of student financial aid are administered according to a nationally accepted policy that the family, meaning parents (or those acting in place of parents) and/or spouse, is responsible for a student's educational expenses. Therefore, eligibility for financial aid will be determined by a comparison of a budget (educational expenses as defined above) for the period of attendance with what the student's family can reasonably be expected to contribute.

A financial aid applicant will be considered for available assistance for which he/she is eligible if the student:

1) Completes the application process and related forms only after thoroughly reading all instructions.
2) Completes the admission application process and is accepted for enrollment at UNC Charlotte.
3) Is working toward a degree and not simply taking courses.

Application Process

To apply for the following programs, a student must complete the Free Application for Federal Student Aid using the instructions and mailing address provided with the form. The form is available in the UNC Charlotte Financial Aid Office.

Federal Stafford Student Loans
Federal Perkins Loan
Federal Work Study
University Grants
University Loans
University Need-based Scholarships

Renewal Process

Renewal of financial aid is based upon a student's making satisfactory academic progress. The Free Application for Federal Student Aid is required each year that a student applies for financial aid.

Financial Aid Programs

Loans

Federal Perkins Loan--Loans of up to $4,000 per year are made to students' with the highest financial needs who apply by the University's established priority date of April 1. The interest rate is five percent with repayment beginning nine months after graduation

Federal Stafford Loans-- Qualified undergraduate applicants may borrow up to $2,625 for the first year, $3,500 for the second year, and up to $5,500 per year for the remainder of undergraduate study. Graduate students may borrow up to $8,500 per year. Independent students may be eligible to receive additional loan amounts.

The interest rate is variable, and repayment begins six months after the borrower ceases to be a student.

Short-Term Emergency Loans-- Students may borrow up to $300 for unanticipated expenses that occur during the semester and up to $1,000 for tuition expenses. Loans have no interest and must be repaid within 30 to 60 days. Funds for these loans are provided by private donation.

Grants

Non-Resident Tuition Differential Grant--This grant is available in selected graduate programs to non-residents of North Carolina. To be eligible, a student must be admitted to full standing in a graduate program, and must hold an assistantship.

North Carolina Graduate Grant--There are a limited number of tuition scholarships available for North Carolina residents to assist with tuition and fees. These are for students of high merit. Students should contact their graduate coordinator about application procedures.

UNC Campus Scholarships--Funding for this program is provided by the General Assembly of North Carolina to each constituent institution of the UNC system. These awards are for North Carolina residents only. These limited awards are provided to doctoral students with exceptional financial need who are recommended by the graduate coordinator of the academic program in which they plan to enroll..

UNC Charlotte Grants--UNC Charlotte administers several other grant programs funded by the State of North Carolina (The State Appropriated Grant) and requires North Carolina residency for consideration. These are available to both graduate and undergraduate students who apply by the established priority date of April 1. Contact the University's Financial Aid Office for information concerning these grants.

Graduate Assistant Support Plan-- The Graduate Assistant Support Plan (GASP) is a highly competitive support package used to attract top graduate students to UNC Charlotte. Under this plan, students supported on a teaching or research assistantship or a fellowship of at least $666.67 per month who meet the minimum registration requirements, receive (at no cost to the student and for a limited number of semesters) fall and spring semester tuition.

Graduate Assistantships

Approximately one-half of the University's full-time graduate students hold graduate assistantships which provide them with financial aid and valuable experience in administration, teaching, and research related to their academic endeavors.

To be eligible for an assistantship, a student must be admitted to full standing in a graduate program and must have had an undergraduate GPA of at least 3.0 or better overall; or must have completed at least six hours of graduate work with a GPA of 3.0 or better.

To retain their appointments, graduate assistants must maintain appropriate enrollment, register for at least 6 graduate-level hours each semester, make satisfactory progress toward their degrees, maintain a minimum 3.0 GPA and perform their assigned duties satisfactorily. It is expected that graduate assistants will not engage in other employment during the term of their assistantship.

Assistantships are available in most graduate degree programs and through some administrative offices. To apply, students should complete the Application for Graduate Assistantship (available from the Graduate School) and submit it to the degree program or administrative office in the winter preceding the academic year for which the assistantship is sought.

Fellowships/Scholarships

While these awards are administered by the Graduate School, in nearly all cases, the individual graduate programs must determine student eligibility and submit nominations to the Graduate School. However, if you are interested in any particular competition or have

questions regarding eligibility requirements, deadlines, and nomination procedures, please contact the Assistant Dean of the Graduate School for Graduate Student Affairs.

Everett Foundation First Year Graduate Fellowship
These first-year fellowships provide stipends of $15,000 and $10,000 plus tuition awards to one newly admitted doctoral student and one newly admitted master's student respectively for their first year of study at UNC Charlotte.

Teachers Insurance and Annuity Association College Retirement Equities Fund (TIAA-CREF) Doctoral Fellowships
Doctoral Fellowship program in three areas of study, Optical Science and Engineering, Applied Mathematics, and Information Technology. Funding for these fellowships is provided through a generous gift to the University by TIAA-CREF to recruit outstanding students who have demonstrated the potential to make a significant contribution to their profession and to society once completing the terminal degree. TIAA-CREF Fellowships provide one year of support to newly admitted students for their first year of doctoral study at UNC Charlotte.

McNair Graduate Fellowship
This award is a stipend supplement to a departmental Teaching or Research Assistantship for up to $3,000 per year for 2 years. Students must be enrolled full-time in a doctoral program and have been a McNair Scholar at their undergraduate institution.

Joanna R. Baker Memorial Graduate Fellowship
Endowed through the generous gifts of the many friends of Dr. Joanna Baker, this fellowship will award $1,000 to a graduate student who has a commitment to a career that will apply information technology to problem solving in the public sector (e.g., criminal justice, health care, government).

John Paul Lucas, Jr. Scholarship
This is an award given each spring semester to a student who has been teaching and wishes to pursue a graduate degree in English in the College of Arts and Sciences or College of Education.

The Robert J. Mundt Memorial Scholarship for International Study
Stipends are available to defray the costs associated with a study abroad experience. All full-time graduate and undergraduate UNC Charlotte students are eligible. Applications are available in the Office of Education Abroad in Room 114 Denny.

Giles Fellowships
Stipends are available to selected doctoral students from donations made to the University by the Giles family. These awards are usually given in addition to a graduate assistantship.

The Zonta Club
The Zonta Club award is given annually to an undergraduate or graduate student who is continuing a university education after considerable time away from formal education. This award covers the cost of one-year's in-state tuition.

UNC Campus Scholarships
Funding for this program is provided by the General Assembly of North Carolina to each constituent institution of the UNC system. These awards are for North Carolina residents only. These limited awards are provided to doctoral students with exceptional financial need who are recommended by the graduate coordinator of the academic program in which they plan to enroll.

National Fellowships
These awards are made to an individual rather than to the University. Recipients are chosen through competitions expressive of the terms of each award. Some examples of these awards are listed below. Contact the graduate program coordinator to discuss available fellowship programs in a specific field.

- National Science Foundation (NSF) Graduate Research Fellowship
- Ford Foundation Predoctoral Fellowship for Minorities
- Department of Defense National Defense Science and Engineering Graduate Fellowship (DOD NDSEG)
- Department of Energy Computational Science Graduate Fellowship
- NASA Graduate Student Researchers Program – Underrepresented Minority Focus Award
- National Consortium for Graduate Degrees for Minorities in Engineering Inc. (GEM) Fellowship
- National Physical Science Consortium: Graduate Fellowships for Minorities and Women in the Physical Sciences

In addition to the fellowships and scholarships mentioned above, a number of the graduate programs have scholarships and/or assistantships available. Please contact the individual units for specific information.

Employment On-Campus

The Student Employment Office assists students in locating work on campus. The University participates in the federal Work-Study Program and attempts to match students with jobs related to their academic interests. International students on F-1 status are permitted, by immigration regulations, to work on campus. Restrictions apply however. F-1 visa status holders are not eligible to participate in the federal Work-Study Program.

Part-Time Employment Off-Campus

The University Career Center's Job Location and Development (JLD) Program assists students in obtaining part-time, summer and temporary employment off-

campus. Job listings may be viewed online to registered students in Campus Professional. Jobs may include career-related positions in various fields such as education, business, entertainment, engineering and healthcare. The JLD Program is available to help students earn money for their academic and personal expenses during their enrollment at the University. Students are encouraged also to participate in career related experiences such as co-op and internships which can be arranged through the University Career Center.

Education for the Vocationally Handicapped

Students who have suffered a disability that renders them vocationally handicapped are eligible for aid provided by the North Carolina State Division of Vocational Rehabilitation. This aid takes the form of services that include vocational counseling and guidance and placement. Payment of expenses such as training, medical treatment, room and board, books, fees, and tuition may be available. A vocational rehabilitation officer is available in Charlotte for interviewing applicants. Appointments may be made by contacting Vocational Rehabilitation Services located at 401 S. Independence Blvd., 704-342-5049.

Veterans Benefits

UNC Charlotte's Veterans Service Office (VSO), located in the Office of the Registrar, works with the Veterans Administration to assist in administering the various programs of benefit to veterans or eligible relatives of veterans. The VSO Certifying Official certifies enrollment and transmits necessary credentials and information to the proper Veterans Administrative Office.

Admission to the University should be obtained before the student makes application for veteran's benefits. Applicants must be accepted into a degree program to receive benefits.

In order to be eligible for the full monthly allowance under any of the above laws, an undergraduate student must be enrolled for 12 or more semester hours and a graduate student must be enrolled for nine or more semester hours. Those enrolled on a part-time basis will be eligible for part time compensation. Students are responsible for reporting any change in enrollment status to the VSO Certifying Official.

Children of Veterans. The North Carolina Department of Veterans Affairs awards scholarships for the children of certain deceased or disabled veterans. Those awarded "full" scholarships are entitled to tuition, mandatory fees, board allowance, and room allowance; those awarded "limited" scholarships are entitled to tuition and mandatory fees. All inquiries should be referred to the North Carolina Division of Veterans Affairs, Albermarle Building, Suite 1065, 325 North Salisbury St., Raleigh, NC 27603, telephone 919-733-3851.

Before the time of registration, each eligible student who wishes to enter the University should: (1) apply for admission following University procedures and (2) apply for a scholarship award to the North Carolina Department of Veterans Affairs.

Academic Regulations And Degree Requirements

STUDENT RESPONSIBILITY

Each student is responsible for the proper completion of his or her academic program, for familiarity with the *University Graduate Catalog* (and where appropriate, the *University Undergraduate Catalog*), for maintaining the grade average required, and for meeting all other degree requirements. The advisor will counsel, but the final responsibility remains that of the student.

A student is required to have knowledge of and observe all regulations pertaining to campus life and student deportment. The University has enacted two codes of student responsibility: **The UNC Charlotte Code of Student Academic Integrity** and **The UNC Charlotte Code of Student Responsibility**, which are summarized in this *Catalog*. As students willingly accept the benefits of membership in the UNC Charlotte academic community, they acquire obligations to observe and uphold the principles and standards that define the terms of UNC Charlotte community cooperation and make those benefits possible.

Each student is responsible for maintaining communication with the University and keeping on file with the Registrar's Office at all times a current address, including zip code, email address and telephone number.

Each student, while associated with the University, is expected to participate in campus and community life in a manner that will reflect credit upon the student and the University.

Catalog Policies

The *Catalog* is not an irrevocable contract. Regulations published in it are subject to change by the University at any time without notice. University regulations are policy statements to guide students, faculty, and administrative officers in achieving the goals of the institution. Necessary interpretations of these policies will be made by the appropriate authorities with the interest of the students and the institution in mind. Students are encouraged to consult an advisor if they have questions about the application of any policy.

"The University reserves the right to change any of the rules and regulations of the University at any time, including those relating to admission, instruction, and graduation. The University also reserves the right to withdraw curricula and specific courses, alter course content, change the calendar, and to impose or increase fees. All such changes are effective at such times as the proper authorities determine and may apply not only to prospective students but also to those who already are enrolled in the University."

Each new edition of the *Catalog* becomes effective at the opening of the fall semester following its publication.

Exceptions to these policies may be necessitated by changes in course offerings, degree programs or by action of authorities higher than the University. In that event, every effort will be made to avoid penalizing the student.

Course Load

An appropriate course load is dependent upon two factors: the scholastic ability of the student as reflected by his/her academic history and the time available for study. A course load of nine semester hours constitutes a normal full semester program for a graduate student. This is lower than the normal undergraduate load because of the extensive reading, independent thinking and individual research required of graduate students. Generally, graduate students should not register for more than 12 semester hours during a semester.

A graduate assistant must register for at least six graduate-level semester hours during each semester in which an assistantship is awarded. Graduate assistants enrolled in the Graduate Assistance Support Plan must register for a minimum of 9 graduate credit hours each term.

International students on F-1 visa/status are required, by immigration regulations, to pursue a full course load during each academic semester, except during official school breaks (i.e. summer vacation and winter holidays) or unless a reduced course load is approved in advance by the Designated School Officer (DSO) at the International Students/Scholar Office. Failure to enroll for a full course load without prior approval is considered a violation of the F-1 legal status.

Registration

The Registrar is responsible for the management of the registration process by which students enroll in classes. Registration policies and procedures for each term are described on the Registrar's Web site The most recent URL to the policies and procedures section of the Registrar's Web site may be found on the Graduate School Academic Regulations Web page at: http://www.uncc.edu/gradmiss/acadregs.html.

Through the registration process, students assume academic and financial responsibility for the classes in which they enroll. They are relieved of these responsibilities only by formally terminating enrollment by dropping or withdrawing in accordance with procedures and deadlines specified by the Registrar each term. For procedures and deadlines related to terminating enrollment, see the Graduate School Academic Regulations Web page at: http://www.uncc.edu/gradmiss/acadregs.html.

Registration Deadlines
University policies determine when students may enroll or adjust their enrollment in classes. Deadlines for the spring and fall semesters are shown below. (*Deadlines for summer sessions are approximately proportional based on the length of the session.*)

Register for classes through the eighth instructional day of the semester.
Drop a class without record (and remain enrolled in other classes) through the sixth instructional day of the semester.
Withdraw from the University without record through the sixth instructional day of the semester.
Drop a class with grade of W recorded (and remain enrolled in other classes) through the sixth week of classes in the semester. No student will be allowed to drop a course after this deadline unless there are extenuating circumstances recognized by the University.
Withdraw from the University with grade of W recorded after the sixth instructional day through the third week prior to the last day of classes of the semester. No student will be allowed to withdraw after this deadline unless there are extenuating circumstances recognized by the University. (See the *Termination of Enrollment* section of this *Catalog.*)

Prerequisites and Permits
Credit will be awarded only to students who are properly registered for it. All students, including non-degree students, are required to meet course prerequisites and to obtain the required permissions to enroll in courses specified in the Schedule of Classes.

Auditors
With the consent of the instructor, a student may register as an *auditor* for any class in which space is available. Fees and procedures for this non-credit enrollment are the same as those for a credit enrollment.

No student will be allowed to change the designation of a course from audit to credit or from credit to audit after the eighth instructional day of a semester (or a proportional period for summer school).

The participation of auditors in class discussion and in tests or examinations is optional with the instructor. Auditors receive no University credit, but they are expected to attend class regularly. A formal record of the audit on the student's transcript is entered at the discretion of the instructor at the end of the course. The procedure for adding or dropping an audit course is the same as for credit enrollments.

Dual Undergraduate and Graduate Registration
Undergraduate students at UNC Charlotte who are required to take fewer than 12 semester hours of undergraduate work to fulfill all requirements for the bachelor's degree may be allowed during their final semester to enroll in certain courses for the purpose of obtaining graduate credit. Authorization for dual undergraduate/graduate registration may be obtained by submitting to the Dean of the Graduate School a Special Request Form approved by the student's undergraduate academic advisor, the instructor(s) of the graduate course(s), and the dean(s) of the college(s) offering the graduate course(s), accompanied by the post-baccalaureate application for admission to graduate study. The total hours to be carried in this status shall not exceed 12 hours, of which no more than nine may be for graduate credit. On the basis of work attempted prior to the final semester, such student must meet the grade point criteria for admission to a graduate degree program at the University. No course for which credit is applied to an undergraduate degree may receive graduate credit. Permission to take graduate courses under dual registration does not constitute admission to any graduate degree program at the University. (Undergraduate students may also take graduate courses if admitted to an early-entry program. See "Early-Entry to Graduate Program" in "The Graduate School" section of the *Catalog.*)

Inter-Institutional Registration
An inter-institutional registration program is available for a limited number of undergraduate and graduate students with the University of North Carolina at Greensboro, North Carolina State University, University of North Carolina at Chapel Hill, Duke University, NC Central University, and NC A&T University. The registration process is initiated in the Registrar's Office and requires the approval of the student's college dean.

Continuous Registration

Students in graduate degree programs are required to maintain continuous registration (fall and spring semesters) for thesis, dissertation, project, or directed study until work is completed. Students are not required to enroll in any summer term unless they are using campus facilities or they are completing degree requirements in that term. Continuous registration begins the semester approval for his/her thesis, dissertation, project, or directed study topic is received. Approval of this topic is documented on the *"Petition for Topic Approval"* form which is filed by the student with the Graduate School. Students who exceed the required number of hours without completing their work should register for "7999" or "9999" (graduate residence) until

the thesis, dissertation, project, or directed study is completed. Students who must remain continuously enrolled but are not using University resources should apply for a leave of absence. Students choosing this option must file a Special Request for a leave of absence that states they will not use University resources during the leave period. If the leave of absence extends beyond two calendar years, the student must re-apply for active status in the graduate program. International students on F-1 visa status may not apply for such leave of absence. Students on F-1 visa/status must remain continuously enrolled until the thesis, dissertation, project or directed study is completed.

Students must be enrolled during the term (semester or summer) in which they graduate from the University.

Change of Degree Program

To change from one degree program to another, a graduate student must complete the application for admission to the new program, pay the requisite application fee, and provide supporting documentation as specified in this Catalog. The student should also provide the Graduate School with a letter indicating withdrawal from the initial degree program. Contact the Office of Graduate Admissions for additional information.

Note: Students on F-1 or J-1 visa status who change from one degree program to another may be required to submit proof of sufficient financial resources, especially if the change to another degree program requires the issuance of a new Form I-20 or DS-2019.

Termination of Enrollment

Drop or Withdrawal (Course))

A student may terminate enrollment in a course but continue enrollment in other courses by following the procedure to drop or withdraw from a course specified on the Registrar's Web site. A student enrolled in only one course must withdraw officially from the University to drop the course.

Withdrawal from the University

Any graduate student voluntarily leaving the University before the close of the term must withdraw officially. A student initiates the withdrawal procedure and files the completed form at the Registrar's Office in person or by letter. A withdrawal is effective when the form or letter is received by the Registrar's Office. A student who withdraws from the University after the sixth instructional day will receive the grade of *W* for all courses in progress. No student will be allowed to withdraw within two weeks prior to the last day of class (or as close to half the summer term as possible) unless there are extenuating circumstances such as serious illness recognized by the University and approved by the Dean of the Graduate School.

Any graduate student who leaves the University before the close of a term without withdrawing officially will receive a failing or unsatisfactory grade (*U* for graduate credit) in each course for which he/she is registered. A graduate student who receives a *U* is automatically suspended from the University and must appeal to the Dean of the Graduate School for reinstatement.

International students on F-1 or J-1 visa status must carry a full course load each academic semester. Students who withdraw from UNC Charlotte are advised to consult the International Student/Scholar Office for information on maintaining valid F-1 or J-1 status, or reinstatement to valid F-1 or J-1 status.

Attendance Policy

Each instructor determines the attendance regulations for his or her classes. Students are expected to attend punctually all scheduled sessions in the courses for which they are registered and are responsible for completing the work from all class sessions.

Absences from class may be excused by the instructor for such reasons as personal illness, religious holidays, or participating as an authorized University representative in an out-of-town event. Whenever possible, students are expected to seek the permission of the instructor prior to absences.

Grading Policies

Instructors assign grades on the basis of their evaluation of the academic performance of each student enrolled in their courses. At the end of the term, the grades are reported to the Registrar's Office which is responsible for maintaining student academic records and making grades available to students.

Final Grades

Final Grades are available through the secure, student access pages of the Registrar's Web page.

Final Grade Changes and Appeals from Final Course Grades

When a final course grade other than Incomplete (I) is officially reported by the instructor at the end of an academic term, the grade is recorded by the Registrar and can be changed only if the grade has been assigned arbitrarily or impermissibly as defined in the Faculty's *"Policy and Procedures for Student Appeals of Final Course Grades,"* available online at http://www.uncc.edu/policystate/gradeappeal.html. Students should follow the procedures outlined in that policy if they believe that the final course grade that has been assigned is incorrect. The policy encourages the student to discuss the grade with the instructor as soon as possible after the grade is received. Students should note, however, that the University is not obliged to respond to a grade appeal unless the student files it with the appropriate department chairperson or interdisciplinary

program director within the first four weeks of the next regular academic semester. When a grade is assigned consistent with University policy, only the instructor has the right to change the grade except as provided in the Incomplete grade policy. When an instructor reports a grade change for a grade other than *I*, the *Change of Grade Form* must be signed by his/her Department Chairperson and Dean.

Grades

Letters are used to designate the quality of student academic achievement.

Grade of I (Incomplete)

The grade of *I* is assigned *at the discretion of the instructor* when a student who is otherwise passing has not, due to circumstances beyond his/her control, completed all the work in the course. The missing work must be completed by the deadline specified by the instructor or during the next semester (fall or spring) in residence, but no later than 12 months after the term in which the *I* was assigned, whichever comes first. If the *I* is not removed during the specified time, a grade of *U* or *N* as appropriate is automatically assigned. The grade of *I* cannot be removed by enrolling again in the same course.

Grade of IP (In Progress)

The grade of *IP* is based on coursework for courses that extend over more than one semester. For example, a course that requires enrollment for two consecutive semesters would be eligible for an *IP* grade in the first term (i.e., Graduate Thesis, Undergraduate Senior Project, etc.) The grade in the second term is also awarded for the course in the first semester. A grade of *IP* should not be given for coursework to be completed in one given term. It cannot be substituted for a grade of *I*. The *IP* grade expires after six years, and if no final grade has been awarded by that time, the *IP* grade will default to a grade of *N* (no credit).

Grade of W (Withdrawal or Drop)

No grade will be given for a course dropped on or before the last day to drop a course without record. After this period a student who is permitted to drop or withdraw from a course will receive a grade of *W*. Only students with such extenuating circumstances as serious illness will be permitted to drop a course after the sixth week of classes in the semester or to withdraw from all courses during the last two weeks of classes in the semester. Unsatisfactory academic performance itself is not an extenuating circumstance. The date of withdrawal is determined when the withdrawal form is accepted by the Registrar's Office.

Pass/No Credit or Pass/Unsatisfactory Option

Certain graduate courses, such as research seminars, tutorials, internships, theses or dissertations, may be designated for *Pass/No Credit* or *Pass/Unsatisfactory* grading upon recommendation of the offering department and approval of the Graduate Council. The grade of *P* in such a course shall be considered as evidence of satisfactory performance. A grade of *N* (No Credit) or *U* (Unsatisfactory) will affect eligibility for continued enrollment and will not apply toward requirements for the degree.

GRADUATE GRADES

Letter	Meaning	Grade Points per Semester Hour
A	Commendable	4
B	Satisfactory	3
C	Marginal	2
U	Unsatisfactory	0
I	Incomplete	
IP	In Progress	
W	Withdrawal	
P	Pass	
N	No Credit	
AU	Audit	
NR	No recognition given for audit	

Grade Point Average

The grade point average for a graduate student is based only on those courses in his/her approved program of study taken at UNC Charlotte. It is determined by multiplying the number of grade points for each grade (*A*=4, *B*=3, *C*=2, *U*=0) by the number of semester hours credit received in that course, adding all accumulated grade points together, and then dividing by the total number of semester hours the student has attempted except those for which the student received a grade of *I*, *IP*, *W*, *P*, *N*, *AU*, or *NR*. When a course not listed as "May be repeated for credit" is repeated, no additional credit hours attempted accrue and the hours earned and grade points of the previous grade are replaced by those of the current grade.

Graduate students must have a 3.0 GPA in the courses on their degree plan of study in order to graduate. However, the grades for all courses attempted will remain on the transcript and will be included in the calculation of the student's GPA as it is reported on the transcript.

Repeating a Graduate Course

A graduate student will be allowed to repeat a maximum of two courses in which the student has been assigned a grade of *C*, *U* or *N* (but not an *I*). If the course grade has resulted in suspension of enrollment, the student must appeal to be reinstated in order to repeat the course. A given course may be repeated one time only. Each grade earned in a repeated course is computed into the grade point average. The record of the first attempt will remain a part of the student's permanent record and will count in the number of marginal (*C*) grades accumulated. Successfully repeating a course does not change the

number of marginal (*C*) grades accumulated. Enrollment will be terminated if a student receives a grade of *U* in a repeated course for which the student previously earned a *U* or *N*.

Academic Records and Transcripts

The Registrar is responsible for maintaining the official academic records for all students. Upon written request by the student, an official transcript of the academic record will be issued by the Registrar's Office to the person or institution designated, provided that all the student's obligations to the University have been settled satisfactorily.

Each student is entitled to one transcript without cost, regardless of how early in his/her academic career the request is made. A fee of $3 per copy must accompany subsequent requests. Requests should reach the Registrar's Office at least one week before the date the transcript is needed and can be made online through the Registrar's Website.

Course Descriptions

Course descriptions provide the following information: subject prefix; course number; course title; semester credit hours assigned to the course; prerequisites and/or corequisites (if any); brief description of the course content; and when the course usually is offered (Evenings, Yearly, Alternate years, Fall, Spring, Summer, On demand). The description may specify the number of class (lecture) and/or laboratory sessions and hours. If no class hours are given, the number of class hours per week is the same as the number of semester hours credit assigned to the course. For example:

SUBJ 6234. Title of Course. (Credit Hours)
Pre/corequisites. Brief description of course content. (Three lecture hours and one three-hour laboratory per week) *(When offered)*

Course Numbering System

Courses are identified by four-digit numbers. The first digit indicates the level of the course: 5000-5999: graduate courses with parallel undergraduate courses listed at the 4000 level; 6000-7999: master's level courses; 8000-9999: doctoral work. The following second digits designate special types of courses: 0 for topics; 4 for internships and practicum, 5 for cooperative education, 6 for seminars, 7 for Honors courses, 8 for independent study, and 9 for research.

ACADEMIC STANDING

Requirements for Continued Enrollment
Students enrolled in any graduate program must maintain satisfactory progress toward the degree. Students are expected to achieve a commendable or satisfactory grade (*A* or *B*) in all course work attempted for graduate credit. Students who fail to maintain satisfactory progress toward their degree or who do not achieve commendable or satisfactory grades in all their graduate course work are subject to suspension and/or termination from their program of study.

International students on F-1 or J-1 visa status must carry a full course load each academic semester. Students who are suspended or terminated from their program of study are advised to consult the International Student/Scholar Office for information on maintaining valid F-1 or J-1 status, or reinstatement to valid F-1 or J-1 status.

Academic Suspension
An accumulation of three marginal *C* grades in any graduate course work will result in suspension of the student's enrollment in the graduate program. If a student makes a grade of *U* or *N* in any graduate course, enrollment will be suspended. A graduate student whose enrollment has been suspended because of grades is ineligible to register in any semester or summer session unless properly reinstated. (Note: Some Departments and/or programs have stricter regulations on suspension than those of the Graduate School. See the academic regulations presented in the program specific sections of this *Catalog*.)

Appeal Procedure
Graduate students may appeal a suspension or termination using the procedures described in the following paragraphs. Other grievances relating to academic status are to be addressed to the Graduate School.

Appeal of Academic Suspension for the Purpose of Reinstatement
A student who has been suspended from a graduate program may appeal his/her suspension and must be reinstated in order to continue his/her program of study. After notification of suspension is received, the student initiates the appeal procedure by submitting a *"Suspension Appeal Form"* (sent to the student with the notice of suspension) to the graduate coordinator/director of his/her academic program explaining any extenuating circumstances. The graduate coordinator/director will forward this form to the Graduate School with a recommendation regarding reinstatement. The Dean of the Graduate School makes the decision on the suspension appeal and notifies the student of the decision in writing.

A student readmitted to a graduate program through reinstatement will be expected to complete the degree program with satisfactory or commendable performance. Should a student receive a grade of *C*, *U* or *N* in a graduate course after being reinstated to the program, enrollment in the graduate program will be terminated.

A student who is denied readmission through the suspension appeal process is considered to be terminated from the graduate program. Terminated students may appeal their termination as identified in the section entitled *"Appeal of Academic Termination for the Purpose of Reinstatement."*

Academic Termination
Academic termination of a graduate student's program of studies may occur in four ways.

1. Students may be required to terminate their graduate studies if they fail to maintain satisfactory academic progress. One example of failure to maintain satisfactory academic progress is non-adherence to the schedule of *"Time Limits for Degrees."*

When a program determines that a student is making unsatisfactory progress, the program notifies the student in writing of the program's concern about the student's performance. Such a warning specifies the source of the concern, the applicable program and/or Graduate School rules, and the proposed action. Warnings specify when and on what basis a recommendation for academic termination will be considered by the program. A probationary period of one academic semester is normal.

Following the probationary period, a student who fails to meet the provisions of the warning is subject to termination from the program. If the program believes that termination is warranted, the graduate program director or coordinator communicates to the Dean of the Graduate School in writing the specific reasons involved, all warnings communicated to the student, the program and/or advisory committee procedures and actions leading to the recommendation, and the mailing address of the student. After considering all of the information, the Dean will make a decision. If the decision is to terminate, the Dean will notify the student of his/her termination from the Graduate School.

2. A student's graduate studies may be terminated if he/she fails to maintain the specific standards of the student's academic program as described in the program specific sections of the Graduate Catalog. For example, a doctoral program may indicate that the accumulation of 2 *C* grades or one *U* grade is grounds for termination from the program.

3. A student's graduate studies will be terminated if, after receiving an initial suspension (see *"Academic Suspension"*) and subsequent reinstatement (see *"Appeal of Academic Suspension for the Purpose of Reinstatement"*), the student receives a grade of *C*, *U* or *N* in a graduate level course.

4. Students who are suspended from a graduate program and are denied re-admittance through the suspension appeal process (see *"Appeal of Academic Suspension for the Purpose of Reinstatement"*) are considered terminated from their graduate program.

In all cases of termination from a graduate program, the student's transcript will bear the notation "Candidacy Terminated."

Readmission of Terminated Graduate Student
Students who have been academically terminated from a UNC Charlotte graduate program are not eligible for readmission to that program or future admission to any other graduate program. However, if **after two years** the student can demonstrate the potential for academic success and/or personal and professional development since leaving the program, the student may initiate a request for readmission to the Graduate School. The student may initiate the request for readmission to the program from which he/she was terminated or to a different graduate program. Students seeking readmission must submit a new application package which includes the full set of materials identified in the section entitled *"General Application Requirements for Admission."* In addition, the student must include a letter explaining the circumstances that led to his/her termination from a UNC Charlotte graduate program and a discussion of the academic and/or personal and professional development since last attending the University that has prepared him/her for a successful return to graduate studies.

Appeal of Academic Termination for the Purpose of Reinstatement
While an action of termination is considered final, a student who is terminated from a graduate program may appeal that termination to the Graduate School if there are unusual or extenuating circumstances. The type of academic termination will determine the permissible grounds for the petition and the specific procedure utilized to initiate the appeal.

Category 1: Academic Termination Based on Failure to Maintain Commendable or Satisfactory Performance in Course Work

Category 1 appeals are available to students who have been terminated for receiving a *U*, *N* or *C* grade after an initial suspension and students who fail to maintain the specific grading standards of an academic program. In these cases, an Appeal of Academic Termination submitted to the Graduate School must be supported by the student's graduate program. Without support from the student's graduate program, academic termination of this type is always considered a final action.

To initiate a Category 1 Appeal of Academic Termination, the student must send a written letter to the Graduate School requesting consideration of his/her case by the UNC Charlotte Graduate School Appeals Committee. In the written request, the student must make his/her case for reinstatement. Included with the student's letter must be at least two letters of support for reinstatement from the student's academic program. For master's degree students, the termination appeal should

include a letter from the program coordinator/director and a letter from the department chair, major advisor and/or the thesis/project advisor. For a doctoral student, a termination appeal should include a letter from the program coordinator/director and the advisory committee or dissertation committee chair. The letters from the program must specify what expectations must be met by the student if he/she is readmitted to the program. A termination appeal request and the supporting documentation must be received by the Graduate School within 30 days of the date on the letter of termination.

Once the Graduate School receives a Category 1 Appeal of Termination, it will be forwarded to the Chair of the Graduate School Appeals Committee. This Committee will review all relevant materials and make a recommendation to the Dean of the Graduate School. The Dean of the Graduate School makes the decision on the Appeal of Termination case and his/her decision is final.

Category 2: Academic Termination Based on Programmatic Action

Category 2 appeals are for students who have been terminated for failure to maintain satisfactory progress in an academic program and for students who have been denied re-admittance through the suspension appeal process. Academic decisions based on the disciplinary expertise and judgment of graduate faculty members and program coordinators/directors in a particular field are not subject to appeal. The fact that a programmatic decision goes against a student's desire for continuation in an academic degree program is not grounds for a termination appeal. However, a Category 2 appeal may be brought on the grounds that there was "procedural error" or "discrimination" in the termination decision.

To initiate a Category 2 Appeal of Academic Termination, the student must send a written letter to the Graduate School requesting consideration of his/her case by the UNC Charlotte Graduate School Appeals Committee. In the written request, the student must make his/her case for reinstatement. If the student is alleging "procedural error," the student must specify what procedures were utilized and how the program deviated from the specified procedures. If the basis of the appeal is "discrimination," the student must show how his/her case was handled substantially different from those of other students in similar circumstances. A termination appeal request and the supporting documentation must be received by the Graduate School within 30 days of the date on the letter of termination.

Once the Graduate School receives a Category 2 Appeal of Termination, it will be forwarded to the Chair of the Graduate School Appeals Committee. The Chair of the Appeals Committee will contact the program in question and request a response to allegations of "procedural error" and/or "discrimination." The program will have two weeks to respond to the request of the Appeals Committee Chair. Once all relevant information had been received, the Committee will review the materials and make a recommendation to the Dean of the Graduate School. The Dean of the Graduate School makes the decision on the Appeal of Termination case and his/her decision is final.

Graduate School Appeals Committee

The Graduate School Appeals Committee is authorized to review appeals for reinstatement from graduate students who have been academically terminated. The Committee does not hear grade appeals, for which a separate procedure exists. The Appeals Committee is comprised of four members. The Assistant Dean for Graduate Student Affairs serves as the ex officio, non-voting chair of the committee. The three voting members of the Appeals Committee are graduate faculty members named by the Dean of the Graduate School. The Graduate Faculty members serve a staggered three year term.

Transferred Credit

The student's graduate program coordinator is responsible for determining the applicability of transferred credits to graduate program requirements. See the appropriate "Degree Requirements" sections of this Catalog for program specific policies. General rules governing transferred credit are:

1) To obtain approval to receive transfer credit, the student must submit an *Application for Transfer of Credit into a Graduate Degree Program* form (available in the Graduate School office), approved by the graduate program coordinator, to the Dean of the Graduate School. If the courses being transferred are from another institution, the student must include an **official** copy of the transcript along with the request. **The University is not obligated to accept any courses for transfer credit.**
2) **No more than six semester hours of transfer credit will be considered for acceptance into a masters degree program.** The amount of transfer credit that may be accepted into a doctoral program varies by program. See program specific policies in this *Catalog.*
3) Courses which have been taken as part of any graduate program at UNC Charlotte or another institution for which the student has received a masters or doctorate degree are not transferable into a second masters degree program. The transferability of masters degree or doctoral course work into a doctoral program varies by program. See program specific policies in this *Catalog.*
4) The grade in any course accepted for transferred credit must be the equivalent of that awarded for commendable (*A*) or satisfactory (*B*) work as defined by UNC Charlotte. It should be noted, however, that although the credit for a course may transfer, the

grade will not be used to calculate the graduate GPA at UNC Charlotte.
5) Courses accepted for transfer are subject to the same time limitation as courses taken in residence.
6) To be considered for transferred credit, the courses must have been undertaken at a regionally accredited institution.
7) Courses in which credit is accepted must be appropriate for approved University programs and curricula in which the student is enrolled.
8) To obtain approval to take a course at another institution while at UNC Charlotte, a student must complete an *Application for Transfer of Credit into a Graduate Degree Program* form, have it approved by the graduate program coordinator prior to taking the course, and file it in the Graduate School. Upon completion of the course(s) the student must request that an official transcript be mailed to the Graduate School listing the course(s) to be transferred.
9) Transfer credit is not awarded for non-degree seeking graduate students.

Credit by Examination

A student currently enrolled at UNC Charlotte may pass a specially prepared challenge examination and receive credit for a University course without having to do the normal course work. The student contacts the program in which credit is sought to request administration of an examination. Since it may not be appropriate to award credit by examination for some courses, the decision to offer an examination is that of the program. If the graduate program authorizes an examination, the student is instructed to pay the fee for credit by examination and to bring the receipt of payment to the examination. Credit by examination will be indicated on the transcript, but no grade points will be awarded. Failure on such an examination will incur no grade-point penalty. No student may challenge a course for which either a passing or failing grade has been received at UNC Charlotte.

Application for the Degree and/or Graduate Certificate

Each student should make application for his/her degree and/or graduate certificate on a form obtained from the Graduate School or the Graduate School's Website no later than the filing date specified in the University Calendar. The application must be accompanied by the filing fee in effect at the time of the application. Degrees are awarded at commencement exercises held at the end of the spring and fall semesters; however, the diploma and transcript will reflect the term in which all requirements were completed. Graduate certificates are not awarded at the commencement exercises. Graduate certificates are mailed directly to the student.

Students completing their degree requirements in May, participate in the May commencement ceremony. Students completing degrees in a summer term as well as those completing in December, participate in the December commencement ceremony.

Earning A Second Degree

A student is permitted to earn a second graduate degree subject to the following conditions:
1) no work applied to a previously awarded degree may be applied to the new degree program,
2) the student must be admitted to a degree program different from that of his/her previous graduate degree(s),
3) the student must successfully meet all requirements for the new degree.

Dual Master's Degrees

In certain instances it may be possible for a student to obtain dual degrees in two master's programs through the development of an integrated curriculum. **It is important to remember that a dual master's degree requires a special arrangement and should be viewed as atypical to standard practice. No degree program is obligated to enter into such an arrangement.**

Although other restrictions may apply, basic admission and degree requirements are specified below:
1) The student must apply to each program separately and be admitted to both. No admission requirements established by the Graduate School or by either individual program may be waived. For example if one degree requires acceptable scores for the GRE and the other the MAT, the applicant must take each standardized exam to be considered for admission to both degrees.
2) Once admitted, the student must develop a suitable plan of study that is acceptable to both programs and to the Graduate School. **This plan of study must be done within the first semester of matriculation and in conjunction with both program coordinators or directors.** The plan of study must be forwarded to the Dean of the Graduate School for review and approval.
3) The student's advisory committee must have representation from both degree programs. If there is no advisory committee, the student must have two advisors; one from each program.
4) The number of required credit hours for both degrees must not be less than 75% of the total minimum hours required to complete each degree separately. For instance if degree program X requires 30 credit hours and Y 30 credit hours, a proposed dual degree should at a minimum require 45 credit hours.
5) The coordinator or director of each degree must agree on which courses may be applied to both sets of graduation requirements.
6) The student must complete the capstone requirements for both programs. For example if program X requires a written thesis and program Y requires a comprehensive exam, the student must meet both degree obligations.
7) If there is a compulsory qualifying exam in each curriculum, it may be possible for the student to take

a single exam as long as the examination committee agrees that the assessment covers sufficient background information for each discipline. If only one program requires a qualifying exam, the student is obligated to take the exam.

8) If the student withdraws or is suspended from one of the participating programs, the dual degree arrangement is automatically nullified.
9) All standard policies relating to transfer of courses, time to degree, residency requirements, and minimum GPA required to graduate, apply to any dual degree arrangement.

No dual degrees will be awarded retroactively.

MASTER'S DEGREE REQUIREMENTS

Residence Requirements

No more than six semester hours of transferred credit are accepted toward a master's degree. All other work must be residence credit.

Residence credit is credit that is earned under the conditions specified herein and may be applied toward the attainment of graduate degrees at UNC Charlotte. These conditions must be satisfied regardless of the location (on campus, on-line, or distance) in which the course is given.

1) Instruction: The instructor must be a member of the UNC Charlotte Graduate Faculty.
2) Course(s): The content of each course must be approved by regularly established college, Graduate School and University curricular processes before the course is scheduled or offered.

Residence credit may also be awarded by virtue of an examination administered by the Graduate Faculty of the department offering credit. A student also, with the prior approval of the appropriate UNC Charlotte department and the Dean of the Graduate School, may take graduate courses for residence and course credit at other regionally accredited institutions.

Advisory Committee

All students in graduate programs must have a graduate advisor who is a regular member of the Graduate Faculty in the student's major program. The graduate program coordinator/director appoints the graduate advisor. In the case of master's programs requiring theses and/or final oral examinations, the graduate advisor serves as chair or co chair of the committee.

In all master's programs requiring a committee, the committee will consist of at least three graduate faculty members, one of whom is designated as chair. In programs not requiring a committee only a major advisor is necessary.

Program Approval

Each student's individual program of study must be approved by his/her department/college. A maximum of six hours of transferred credit may be included in the approved program of study.

Admission to Candidacy

Upon successful completion of a minimum of 18 semester hours of graduate work and in no case later than four weeks prior to the beginning of the semester in which he/she expects to complete all requisites for the degree, a student should file for admission to candidacy on a form supplied by the Graduate School. This application is a check sheet approved by the student's adviser, department chairperson and college dean listing all course work to be offered for the degree (including transferred credit and courses in progress).

Minimum Hours and Quality

A student is expected to satisfactorily complete a minimum of 30 to 60 semester hours of approved graduate level courses, depending upon his/her individual program, with an overall GPA of 3.0 or better in courses on the degree plan of study. Grades in all courses attempted, whether or not on the plan of study, will remain on the transcript and will be included in the calculation of the student's GPA as it is reported on the transcript. No more than six hours evaluated as C may be counted toward the minimum hours required for the master's degree.

Comprehensive Examination

After admission to candidacy, each student must successfully complete a comprehensive examination. The examination may be written, oral, or both, depending upon the student's specific program requirements. Generally, a student is allowed to take the comprehensive exam two times. A student who fails the comprehensive exam the second time is terminated from the master's degree program. Students must be enrolled during the semester in which they take the comprehensive examination.

Time Limit

University policy requires that no course listed on a master's student's candidacy form be older than six years at the time of graduation. This policy is in place because of the University's interest in a degree being current when it is awarded. Courses that exceed this time limit must be revalidated or retaken, whichever the graduate program decides necessary, if they are to count in a degree program.

To revalidate a course, the student, along with the program coordinator and the course instructor, prepare a revalidation plan that must be reviewed and approved by the Dean of the Graduate School. This plan often involves taking a special examination designed by the

faculty of the graduate program. Once the plan has been completed, the program coordinator must notify the Dean of the Graduate School in writing.

Students may not revalidate courses with a grade of *C* or lower, courses that are internships or other forms of practica, or courses taken at other institutions. **Additionally, no more than 25% of the courses on a student's program of study may be revalidated and for master's students no course older than eight years may be revalidated.**

Thesis

The plan of study for a master's degree may or may not include completion of a thesis. The thesis and non-thesis approaches are designed to meet the needs of students preparing for different types of careers and represent qualitatively different educational experiences. Consequently, the academic departments and the Dean of the Graduate School discourage any switching from one plan to another. If a switch from a thesis to non-thesis plan is approved, the grade of I for the thesis work will be changed to W on the transcript with no refund of tuition for the course(s). At the time that the graduate program approves the student's thesis topic, the Petition for Topic Approval must be filed with the Graduate School. This form is available in the Graduate School and on the Graduate School Website.

The thesis should be submitted for final approval by the student's thesis committee at least three weeks before the date of the oral examination in which the thesis is defended. Following the successful completion of this defense, the master's candidate must submit three unbound copies of the approved and error-free thesis to the Graduate School no later than the filing date indicated in the University Calendar. Guidelines for the preparation of the thesis are available from the Graduate School and on the Graduate School Website.

Course and Other Requirements

The course and other requirements for specific degree programs are presented in the section of this *Catalog* on Graduate Programs.

PH.D. DEGREE REQUIREMENTS

A doctoral degree is conferred by the University after the student has demonstrated outstanding scholarship in an approved program of study. Candidates must satisfy all University degree requirements in addition to all standards established by the doctoral faculty of their particular program. Specific program degree requirements are listed under the respective doctoral programs in this *Catalog*. In some cases, requirements in a given program are more stringent than the minimum requirements established by the Graduate School.

Ordinarily, a student must complete at least 72 post-baccalaureate credit hours in order to earn the Ph.D.

Advisory Committees

All students in graduate programs must have a graduate advisor who is a regular member of the Graduate Faculty in the student's major program. The graduate program coordinator/director appoints the graduate advisor.

For doctoral students the committee will consist of at least four Graduate Faculty members, one of whom is appointed by the Dean of the Graduate School as the Graduate Faculty representative.

The committee for doctoral students is indicated on the Petition for Topic Approval (available in the Graduate School office). At the time that the Petition for Topic Approval is approved, the Graduate School appoints the Graduate Faculty Representative to serve on the doctoral committee.

Program of Study

Although the maximum amount of credit past the baccalaureate degree that a Ph.D. student may count towards a doctorate is 30 semester hours, only courses appropriate for the approved program and curriculum in which the student is enrolled may be transferred. Appropriate courses should be determined by the student's supervisory committee and approved by the program coordinator before the request is submitted to the Graduate School. This rule applies whether the courses were taken at UNC Charlotte or elsewhere and whether a master's degree was earned or not. However, no more than six hours taken when the student was in post-baccalaureate (non-degree seeking) status may be applied toward the doctoral degree.

Program Approval

By the end of the first semester of the third post-baccalaureate year in the program and no later than the filing of the petition to sit for the qualifying examination, a student's program of study must be approved by his or her advisory committee and submitted to the Dean of the Graduate School.

Course and Other Program Requirements

The course and other requirements for each degree program are indicated in the program descriptions in the following pages.

Time Limit

All courses beyond the master's degree, including accepted transferred credit, that are listed on the candidacy form cannot be older than eight years at the time of graduation. Courses that exceed this time limit must be revalidated or retaken, whichever the graduate

program decides necessary, if they are to count in a degree program.

To revalidate a course, the student, along with the program coordinator and the course instructor, prepare a revalidation plan that must be reviewed and approved by the Dean of the Graduate School. This plan often involves taking a special examination designed by the faculty of the graduate program. Once the plan has been completed, the program coordinator must notify the Dean of the Graduate School in writing.

Students may not revalidate courses with a grade of C or lower, courses that are internships or other forms of practica, or courses taken at other institutions. **Additionally, no more than 25% of the courses on a student's program of study may be revalidated and no course older than ten years may be revalidated.**

Residence

All doctoral students are required to complete a substantial residency requirement during which they have sustained contact with the graduate faculty. This requirement is specified in the program descriptions.

Graduate Faculty Representative

The graduate faculty representative is a member of the doctoral student's advisory committee appointed by the Graduate School. This faculty member's role is primarily procedural. He/she must 1) assure that the doctoral student is treated fairly and impartially by his or her advisory committee, and 2) assure that University standards and policies are upheld. This representative is appointed prior to the student's taking the qualifying examination and must participate in the examination, in the dissertation topic approval process, and in the final examination. A student's advisor may consult with the Dean of the Graduate School regarding selection of this representative.

Qualifying Examination

Each student must complete a qualifying examination. Ordinarily students who enter a Ph.D. program directly from a baccalaureate program sit for this examination before the end of their third post-baccalaureate year in the program while students who enter a Ph.D. program from a master's degree program take the examination before the end of their first year in the doctoral program. To sit for this examination, the student must have at least a 3.0 GPA and must have removed any conditions upon admission.

Re-examination

A student who fails the qualifying examination may petition the program faculty to be re-examined. The re-examination may take place no sooner than the beginning of the semester following the one in which the failure occurred. A student who fails the qualifying examination a second time is terminated from the doctoral program.

Candidacy

The dissertation topic may be proposed after the student has passed the qualifying examination. A doctoral student advances to candidacy after the dissertation topic has been approved by the student's advisory committee and the Dean of the Graduate School. Candidacy must be achieved at least six months before the degree is conferred.

Dissertation

The doctoral program of study must include 18 hours of research credit including dissertation credit. The doctoral candidate must be continuously enrolled in dissertation credit hours (See also section: Student Responsibility - Continuous Registration) beginning with the semester after the dissertation topic is approved until the semester of graduation.

The dissertation must be submitted for final approval by the student's committee at least three weeks before the date of the final examination in which the dissertation is defended. Following the successful completion of this defense, the doctoral candidate must submit four unbound copies of the approved error-free manuscript to the Graduate School no later than the filing date indicated in the University calendar. Guidelines for the preparation of the dissertation are available from the Graduate School and on the Graduate School Website.

The Graduate School requires publication of the dissertation on microfilm and in *Dissertation Abstracts International* by University Microfilms International of Ann Arbor, Michigan. The student is responsible for paying the microfilming and optional copyrighting fees. Any other arrangements for publications of the dissertation must not interfere with publication by University Microfilms International.

Final Examination

Each candidate must pass a final examination over the contents of the dissertation. Sometimes called the "dissertation defense" or the "dissertation oral," this meeting is traditionally open to members of the University community. No student is permitted to take the final examination more than twice.

ED.D. DEGREE REQUIREMENTS

The Doctor of Education (Ed.D.) degree is conferred by the University after the student has successfully completed all requirements in an approved doctoral program of study in the College of Education. Specific program degree requirements are described in the College of Education section of this *Catalog*.

Program of Study
Although the maximum amount of credit past the Master's of School Administration (M.S.A.) degree that an Ed.D. student may count towards a doctorate is 9 semester hours, only educational administration courses approved by the program coordinator may be transferred. This rule applies whether the courses were taken at UNC Charlotte or elsewhere; however, no more than six hours taken when the student was in post-baccalaureate (non-degree seeking) status may be applied toward the doctoral degree.

Time Limit
All courses, including accepted transferred credit(s) that are listed on the candidacy form, cannot be older than eight years at the time of graduation. Courses that exceed this time limit must be revalidated or retaken, whichever the graduate program decides necessary, if they are to count in a degree program.

To revalidate a course, the student, along with the program coordinator and the course instructor, prepare a revalidation plan that must be reviewed and approved by the Dean of the Graduate School. This plan often involves taking a special examination designed by the faculty of the graduate program. Once the plan has been completed, the program coordinator must notify the Dean of the Graduate School in writing.

Students may not revalidate courses with a grade of C or lower, courses that are internships or other forms of practica, or courses taken at other institutions. **Additionally, no more than 25% of the courses on a student's program of study may be revalidated and no course older than ten years may be revalidated.**

Comprehensive Examination
Students are required to successfully pass a written and oral examination. The examination is based upon the core areas of educational leadership, educational research, and instructional technology.

Admission to Candidacy Requirements
Students are recommended for admission to candidacy after successfully completing the written and oral comprehensive examination.

Dissertation
Students must complete and defend a dissertation focused on a specific problem or question relevant to K-12 educational organizations, administration, or leadership. Students must be continually enrolled in ADMN 8999 (3 hrs) (fall, summer and spring sessions) for dissertation research credit, beginning with the semester following completion of the comprehensive examination and continuing through the semester of their graduation. Defense of their dissertation is conducted in a final oral examination that is open to members of the University community.

Graduate Faculty Representative
The graduate faculty representative is a member of the doctoral student's advisory committee appointed by the Graduate School. This faculty member's role is primarily procedural. He/she must 1) assure that the doctoral student is treated fairly and impartially by his or her advisory committee, and 2) assure that University standards and policies are upheld. This representative is appointed prior to the student's taking the qualifying examination and must participate in the examination, in the dissertation topic approval process, and in the final examination. A student's advisor may consult with the Dean of the Graduate School regarding selection of this representative.

Application for Degree
Students may submit an Application for Degree during the semester in which they successfully defend their dissertation proposal. Adherence to Graduate School deadlines is expected. Degree requirements are completed when students successfully defend their dissertation and file the final copy of the dissertation in the Graduate School.

GRADUATE CERTIFICATE REQUIREMENTS

The graduate certificate is awarded for successful completion of a coherent program of at least 12 credit hours proposed by a unit of the graduate faculty and approved by the Graduate Council. Students are admitted to a particular graduate certificate program and are advised by faculty in the unit offering the graduate certificate. Admission to a graduate certificate program is separate and distinct from admission to a graduate degree program. Admission to a certificate program is not an indication of subsequent admission to a degree program just as admission to a degree program is not an indication of admission to a certificate program.

Since the graduate certificate is not a degree, students may apply the credits earned in the certificate program toward a degree that they pursue either in conjunction with the graduate certificate or after the certificate has been awarded. However, students may not apply credits earned in one certificate program toward the satisfaction of requirements in a second certificate program.

Students may enroll in a graduate certificate program only or may complete the certificate in conjunction with a graduate degree program at the University. Hours taken toward a graduate certificate may be counted toward a graduate degree program with the recommendation of the

graduate program coordinator and the approval of the Graduate School.

Graduate certificate programs generally require at least 12 credit hours of graduate course work. Up to six hours taken at post-baccalaureate status at UNC Charlotte may be applied toward a certificate with the recommendation of the program coordinator and the approval of the Graduate School. Students ordinarily may not transfer hours from another institution into a certificate program. The graduate certificate is awarded to a student who has completed the specified program of study with a GPA of 3.0 or better within four years from the time of enrollment in the first certificate course.

Note: No Graduate Certificates will be awarded retroactively.

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA) NOTIFICATION

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. They are:

1) The right to inspect and review the student's education records within 45 days of the day the University receives a request for access.

Students should submit to the Registrar, dean, head of the academic department, or other appropriate official, written requests that identify the record(s) they wish to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2) The right to request amendment of the student's education records that the student believes are inaccurate or misleading.

Students may ask the University to amend a record that they believe is inaccurate or misleading. They should write the University official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading.

If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student's when notified of the right to a hearing.

3) The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

One exception that permits disclosure without consent is disclosure to school officials with legitimate educational interests. A school official is a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person serving or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks.

A school official has legitimate educational interest if the official needs to review an education record in order to fulfill his her professional responsibility.

4) The right to file a complaint with the U.S. Department of Education concerning alleged failures by UNC Charlotte to comply with the requirements of FERPA. The name and address of the Office that administers FERPA is: Family Policy Compliance Office, U.S. Department of Education, 600 Independence Avenue, SW, Washington, DC 20202.

UNC Charlotte intends to comply fully with these requirements. Policy Statement No. 69, "The Privacy of Educational Records," explains the procedures for compliance. Students may obtain copies of the Policy in the Office of the Registrar or http//www.uncc.edu/unccatty/policy/state/, and copies of the policy statement are available for inspection in the offices of each dean and department chair. The policy includes a list of the locations of all education records maintained by the institution.

The following categories of personally identifiable information about students have been designated as public or "directory" information which may be disclosed for any purpose without student consent: name, local and permanent address, telephone number, email address, date and place of birth, class, major field of study, dates of attendance, degrees and awards (including scholarships) received, participation in officially recognized activities and sports, and weight and height of members of an athletic team.

Currently enrolled students may withhold disclosure of information in any category by completing the appropriate form available in the Office of the Registrar.

Written requests for non disclosure will be honored for a maximum of one year, and all such requests will expire on the following August 31. UNC Charlotte assumes that failure to complete the request indicates approval for disclosure.

All questions concerning this policy on educational records may be directed to the attention of the Registrar.

College of Architecture

The College of Architecture at the University of North Carolina at Charlotte offers a fully accredited program recognized for the outstanding quality of its faculty and students, its commitment to outreach and community involvement, and the quality and extent of resources offered through its labs, classrooms, and studios. Students organize their study around concentrations in Urbanism, Technology, or Design, Theory & Practice. Each area of study is well supported not only by coursework but also by travel and research opportunities. The College participates in several international exchange programs and offers summer travel and study programs in Spain, Italy, Canada, and Australia to broaden students' global understanding and further inform their work. Locally the Charlotte Community Design Studio (CCDS) offers hands-on experience with urban design efforts affecting Charlotte and the region while the work of a design-build studio each year affects the lives of economically disadvantaged citizens of our community on a more intimate scale.

The program offers each student significant individual time and attention, an engaged and accessible faculty, and a wealth of diversity through both the interests of the faculty and the varied background of the graduate students themselves. Because the College stresses the importance of 'making' in addition to thinking, the wood, metal, computer, and laser workshops are all equipped with the latest high performance equipment to enable students to both explore and embody their design ideas. Contact with the profession is also emphasized and the College is frequently enriched by the expertise of local practitioners. An extensive lecture series involving nationally and internationally recognized designers and theorists further enhances the educational environment and exposure to current artifacts and schools of thought.

Graduate Degree Programs
Master of Architecture I
Master of Architecture II

ARCHITECTURE

College of Architecture
Storrs Architecture Building
http://www.coa.uncc.edu/
704-687-2358

Degree
Master of Architecture

Program Coordinator
José L.S. Gámez Assistant Professor

Graduate Faculty
Dale Brentrup, Professor
Kelly Carlson-Reddig, Associate Professor
Paul Clark, Assistant Professor
Jose Gamez, Assistant Professor
Lee Gray, Associate Professor, Associate Dean
Chris Grech, Associate Professor
Charles Hight, Professor
Ken Lambla, Professor, Dean
Mark Morris, Visiting Assistant Professor
John Nelson, Associate Professor
Deb Ryan, Associate Professor
Linda Samuels, Assistant Professor
Erci Sauda, Professor
Greg Snyder, Associate Professor
Michael Swisher, Associate Professor
David Thaddeus, Associate Professor
David Walters, Professor
Betsy West, Associate Professor, Chair of Instruction
Peter Wong, Associate Professor

MASTER OF ARCHITECTURE

Program Description
The Master of Architecture degree (MArch) serves two groups of students: 1) the three-year MArchI Program, which includes two summer sessions accommodates students whose previous degree is outside the field of architecture; and 2) the two-year MArchII Program serves students who have already completed a four-year degree program in architecture at a National Architectural Accrediting Board (NAAB) accredited institution. The courses and options within each program are similar, but the advanced standing of MArchII students allows them to complete the degree requirements in two years. Students in both programs must complete a comprehensive design studio and a thesis project under the advisement of a faculty committee. Full time academic status is expected in both programs.

The MArchI Program involves four primary components: 1) the first year focuses on establishing a strong foundation in fundamental design skills, architectural history and theory, building-to-site relationships, and introductory building technologies; 2) the second year focuses on comprehensive architectural design and its relationship to building systems as well as advanced studies in history, theory, and building technology; 3) the summer study program provides the opportunity to engage international education, research,

or design experience; and 4) the third year is focused on the student's thesis research and project execution.

The MArchII Program is tailored through the advising process to the previous educational background of the students and to their individual professional and research goals. The program involves two primary components: 1) the first year focuses on comprehensive architectural building design and topical studios with advanced studies in the area of concentration; and 2) the second year is dedicated to continued study within the area of concentration as well as thesis research and project execution.

Admission Requirements

In addition to the admissions materials required by the Graduate School, the College of Architecture requires the submission of a portfolio of creative work. Applicants to the MArchI program should submit examples of work that offer evidence of creativity, self-motivation and critical appraisal. Such examples are not expected to be architectural in nature. Visual work such as painting, sculpture, furniture making, photography, etc. are acceptable as are fiction writing, poetry, and any other reasonable evidence of sustained creative endeavor. Applicants to the MArchII program may offer similar evidence of any kind of creative endeavor but must also offer significant evidence of a mastery of architectural skill and knowledge.

Students who complete the professional track of the four year Bachelor of Arts in Architecture degree program at UNC Charlotte and meet the following criteria will be permitted automatic admission to the MArchII Program:

1) Students must complete their undergraduate degree with a 3.0 grade point average in Architecture.
2) Students must complete their undergraduate degree with a 2.75 grade point average overall, and a junior/senior grade point average of 3.0 overall.
3) Students must complete a Statement of Purpose describing their objectives relative to graduate study.
4) Students must fulfill the university's Graduate School application requirements in effect at the time of their application.

Students who do not meet the grade point average requirements noted above may submit an application for admission to the MArchII program for consideration with applicants from other architectural programs.

Degree Requirements

Concentrations within the MArchI & MArchII Programs

At the end of the third semester of study, MArchI students are required to choose an area of concentration that will guide their advanced studies. MArchII students are required to choose an area of concentration during their first semester. Concentrations include 1) Architectural Design, Theory, & Practice, 2) Urbanism, and 3) Architectural Technology. Concentration coursework is comprised of three elective courses (selected by the student from a larger set of eligible courses) and one elective studio with a focus similar to that of the concentration (offered as a topical studio). The concentrations from which students can choose are described below:

Architectural Design, Theory, & Practice
This concentration focuses on a sophisticated and detailed study of building and site design involving issues of form, space, order, and typology as well as cultural and physical context, concept, meaning, etc. It includes both investigation and criticism of contemporary practice and practitioners as well as the role of theory and historical precedent relative to the design and making of architecture.

Urbanism
This concentration focuses on the critical role of architecture in the city - the process and specific intent of physical intervention in urban landscapes and infrastructures. Through the design of groups of buildings as well as larger scale urban areas, issues of policy, politics, finance, planning, place, and culture are introduced as part of the essential conception and history of the city fabric.

Architectural Technology
This concentration focuses on study and experimentation addressing emerging issues of sustainable design and the creative development of building envelopes and systems that utilize both new and traditional materials, technology, and construction methods in innovative and beautiful ways. Seeking to explore the historical as well as contemporary realms of thermal, tactile and visual issues embedded in this field, students address appropriate material selection, methods of daylighting, passive and active systems for heating and cooling, etc. with consideration of both qualitative and quantitative outcomes.

Master of Architecture I Curriculum

The MArchI program requires a minimum of 93 hours to be completed during three academic years and two summer sessions.

GA Elective	General Architectural elective
AH Elective	Architectural History elective (minimum of one required during the second year of study)
C Elective	Concentration elective (minimum of three required)

Summer (3 hours)

ARCH5050	Introductory Design Experience (3)

Year 1 - Fall (13 hours)

ARCH6111	Design Fundamentals Studio (7)
ARCH5211	Architectural History Survey One (3)

ARCH5601 Ideas in Architecture (3)

Year 1 - Spring (15 hours)
ARCH6112 Design Fundamentals Studio (6)
ARCH5212 Architectural History Survey Two (3)
ARCH5312 Architectural Materials (3)
ARCH6151 Design Methodologies (3)

Year 2 - Fall (14 hours)
ARCH7101 Design Studio (5)
ARCH5313 Structures One (3)
ARCH5315 Environmental Control Systems (3)
ARCH5213/
ARCH6050 AH Elective or C Elective (3)

Year 2 - Spring (14 hours)
ARCH7102 Topical Design Studio (5)
ARCH5314 Structures Two (3)
ARCH6050 C Elective (3)
ARCH5214/
ARCH 6050 AH Elective or C Elective (3)

Summer (6 hours)
ARCH7110 Summer Study Program (6)

Year 3 - Fall (14 hours)
ARCH7103 Topical Design Studio (5)
ARCH5317 Building Systems Integration (3)
ARCH7111 Project/Thesis Document Prep (3)
ARCH5213/
ARCH6050 Any Elective within the College of Architecture or a Directed University Elective (3)

Year 3 - Spring (14 hours)
ARCH7104 Project/Thesis Studio (8)
ARCH5112 Professional Practice (3)
ARCH5213/
ARCH6050 Any Elective within the College of Architecture (3)

Master of Architecture II Program

The MArchII program requires a minimum of 56 credit hours to be completed during two academic years. If applicants accepted to the MArchII Program are evaluated and found deficient in entry-level competencies, they will be required to enroll in additional course work beyond the 56 credits to complete their degree. Below is a list of expected entry-level competencies.

Expected Entry-Level Competencies for MArchII Candidates:

1) A minimum of six semesters of architectural design studios;
2) A minimum of four semesters of architectural history and/or theory courses;
3) A minimum of four semesters of building technology courses equivalent to the following UNCC College of Architecture courses:
   ARCH5312 Architectural Materials
   ARCH5313 Structures One
   ARCH5314 Structures Two
   ARCH5315 Environmental Control Systems.

To ensure that incoming students are evaluated appropriately, the College of Architecture requires candidates for the MArchII program to furnish the Architecture Graduate Admissions Committee and Graduate Program Coordinator relevant course descriptions and syllabi of all architecture courses passed and completed which may satisfy entry-level competencies. The following curriculum is modeled for students accepted to the program who have satisfied all entry-level competencies.

Students who complete professional track of the four year Bachelor of Arts in Architecture degree program at UNC Charlotte and meet the following criteria will be permitted automatic admission to the MArchII Program:

1) Students must complete their undergraduate degree with a 3.0 grade point average in Architecture.
2) Students must complete their undergraduate degree with a 2.75 grade point average overall, and a junior/senior grade point average of 3.0 overall.
3) Students must complete a Statement of Purpose describing their objectives relative to graduate study.
4) Students must fulfill the university's Graduate School application requirements in effect at the time of their application.

Students who do not meet the grade point average requirements noted above may submit an application for admission to the MArchII program for consideration with applicants from other architectural programs.

Master of Architecture II Curriculum

GA Elective General Architectural elective
AH Elective Architectural History elective (minimum of one required during the second year of study)
C Elective Concentration elective (minimum of three required)

Year 1 - Fall (14 hours)
ARCH7101 Design Studio (5)
ARCH5213 AH Elective (3)
ARCH5317 Building Systems Integration (3)
ARCH5213/
ARCH6050 Any Elective within the College of Architecture (3)

Year 1 - Spring (14 hours)
ARCH7102 Design Studio (5)
ARCH6151 Design Methodologies (3)
ARCH6050 C Elective (3)
ARCH5213/
ARCH6050 Any Elective within the College of Architecture (3)

Summer (3-5 hours - Optional)

ARCH7120 Graduate Summer International Study (Optional) (3)
ARCH7950 Graduate Summer Research Study (Optional) (3)

Year 2 - Fall (14 hours)

ARCH7103 Design Studio (5)
ARCH7111 Project/Thesis Document Prep (3)
ARCH5213/
ARCH6050 Any Elective within the College of Architecture (3)
ARCH5213/
ARCH6050 Any Elective within the College of Architecture or a Directed University Elective (3)

Year 2 - Spring (14 hours)

ARCH7104 Project/Thesis Studio (8)
ARCH5112 Professional Practice (3)
ARCH5213/
ARCH6050 Any Elective within the College of Architecture or a Directed University Elective (3)

Requisite & Capstone Experiences

Comprehensive Design Project

The Comprehensive Design Project serves as the requisite studio experience that bridges between foundational studios and advanced studios for MArchI students. The Comprehensive Design Project serves as the point of entry into the program for MArchII students. Taken in the third semester of enrollment for MArchI students and in the first semester of enrollment for MArchII students, the Comprehensive Design Project is defined as an architectural building design project that comprehensively demonstrates the student's ability to conceptualize, prepare, organize, and design a building having a specific programmatic type. All students must demonstrate comprehensive design competency before they enroll in Topical or Elective studios.

Thesis

The normative capstone project for both MArchI and MArchII students is the Thesis. For MArchI students, a thesis is defined as an architectural design project that demonstrates the student's ability to independently identify and engage a specific set of issues, a building type, and a site. For MArchII students, a thesis is defined as an architectural research project that engages and explicates primary source material leading to project work possessing an original argument. This type of project may include design-related materials as part of the final submission. Primary source material is data and information gathered from original texts and documents, interviews, raw data resulting from experiments, demographic data, etc. An original argument is a proposition that leads to original idea(s) in the discipline arising out of primary source material.

For the Thesis, the student identifies the issue(s) to be engaged and the research and/or design methods through which this engagement will take place. The student works independently with a committee during the final year of study to complete the Thesis. All students must demonstrate comprehensive design competency before they engage a Thesis.

Graduate Advising

A critical component of any successful graduate program is academic advising and guidance during the course of a student's program of study. The primary advisor for all graduate students in the College of Architecture will be the Associate Dean in consultation with the Graduate Coordinator. Students entering their final year will be asked to complete a Plan of Study and identify committee members from the faculty to serve as advisors for their thesis.

Transfer Credit

Transfer credit is normally limited to a maximum of six hours of graduate credit. Under special circumstances, a greater number of hours may be transferred if a student can demonstrate that the courses to be transferred meet or exceed the content and rigor of graduate curricula offered by the College.

Waiver Credit

Waiver credit may be allowed if a student can demonstrate that a course or courses taken in his or her undergraduate curriculum equals or exceeds in both content and rigor of a course or courses required in the graduate curriculum. If a required course in the curriculum is waived, the student will be allowed to fill those credit hours with another course as advised by the Associate Dean in consultation with the Graduate Coordinator.

Committees

For thesis, each student identifies three (3) College of Architecture faculty members who will contribute to his or her interests, research, and final project. In addition, one (1) committee member from outside the College of Architecture faculty is required. Additional individuals relevant to a student's final project may also participate as ex-officio members.

The members of the committee should offer specific areas of expertise and insight relative to the proposed project. Members of this committee should be involved with the project beginning with the preparation of the research document undertaken in ARCH 7111 (Research Document) in the Fall semester.

The responsibility of each committee member involves the following:

1) Review and provide feedback on three (3) successive versions of the student's written research document

produced in ARCH7111 (Research/Thesis Document).
2) Be present and provide feedback at all public presentations (4-5) conducted in ARCH 7104 (Comprehensive Design/Thesis Project Studio).
3) Provide feedback on other occasions as requested by the student.
4) Meet with instructors of ARCH7111 and ARCH7104 as required for coordination.
5) Deliberate with other committee members on the report concerning degree conferral.

Application for Degree

In order to meet UNC Charlotte's Graduate School requirements for degree candidacy, all graduate students must receive a written certification from their department confirming successful Thesis defense. This report requires approvals from members of each student's committee as well as an endorsement from the Chair of Instruction. The completion of this report results in the granting of the degree.

Research Opportunities

MArchI students must take ARCH7110 in the summer prior to their final year. The premise of this course is to allow students to tailor a summer experience to support their growing knowledge of architecture and architectural discourse. This experience is intended to inform and motivate possible interests that the students might pursue in their final year of study. As such, it is an ideal opportunity for research. A similar opportunity exists for MArchII students who take ARCH7120 or ARCH7950. There are three study options that students may engage:

1. Funded Research Option:
Students may elect to work with faculty and/or other researchers who are conducting professional, scholarly, applied, and/or creative research within specialized fields of architecture theory, history, technology, etc. Current research initiatives include lighting and energy studies, building envelope studies, urban studies, and design/theory studies. These activities are engaged through the Lighting & Energy Technology Lab, the Digital Design Center, the Charlotte Community Design Center, and through individual faculty research projects and ongoing architectural practice. Students may also complete the requirements by securing their own grants and funding to study a well-defined and focused architectural issue. Student initiated research of this type must be approved both by the student's Academic Advisor and by the Graduate Program Coordinator.

2. Independent Design Option:
Students may elect to receive credit for this class by completing and entering a regional, national, or international architectural competition. This option is intended to further students' study of ideas and issues relevant to their thesis project and area of Concentration.

3. Off-Campus and/or International Study Option:
Students may elect to enroll in College of Architecture off-campus or international study programs, and/or enroll in similar programs offered by other NAAB accredited institutions. The College has long-standing study/travel programs in both Italy and Spain. Students have also pursued study opportunities in the Netherlands, Australia, Canada, etc. Glenn Murcutt's Master Class (Australia) and Brian MacKay Lyons' Ghost Project (Canada) are among the international study options that students may undertake.

Assistantships, Tuition Differentials, and Scholarships

A number of teaching assistantships, scholarships, tuition differentials, and tuition waivers are available to both MArchI and MArchII candidates. Awards are based on the applicant's academic merit or promise of academic merit, and/or on demonstration of need.

Program Accreditation

National Architectural Accrediting Board
All graduate programs of the UNC Charlotte College of Architecture are fully accredited by NAAB as professional degree programs leading to licensure. The NAAB defines an accredited degree as described below:

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Masters degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

Following the completion of a professional degree program accredited by the NAAB, most states require the future architect to complete an internship working for a registered architect before sitting for the licensing examination.

Courses in Architecture

Studio Courses

ARCH 5050. Introductory Design Experience. (3)
Prerequisite: B.A., B.S. or equivalent college degree. This introductory graduate course in architecture is intended for students newly admitted to the College of Architecture's MArchI professional program. This three week, intensive studio-based course includes an

introduction to freehand drawing, 2-D composition, 3-D modeling, and visual theory. In addition, the course offers an introduction to a variety of related topics (history, structure, lighting, materials, etc.) that serve as critical departure points for understanding and making architectural projects. *(Summer)*

ARCH 6111. Design Fundamentals/Skills. (7) Corequisite: ARCH5601. This introductory architectural design studio focuses on fundamental concepts of architecture as well as the acquisition and practice of a wide range of technical and graphic skills and media. It is intended to complement the reading and writing engaged in ARCH5601 (Ideas in Architecture) and to serve as an arena to explore and test the issues encountered in that course through the act of making. *(Fall)*

ARCH 6112. Design Fundamentals/Skills. (6) Prerequisite: ARCH6111. This introductory architectural design studio focuses on the development of site, space, and design process issues as well as the continued acquisition and practice of a variety of technical and graphic skills. Exploration into the creative and appropriate use of a variety of media is addressed. *(Spring)*

ARCH 7101. Comprehensive Design Studio. (5) Prerequisite ARCH6112. This design studio focuses on a site-specific project emphasizing technological and systemic issues that lead toward a comprehensive building design. *(Fall)*

ARCH 7102. Topical Design Studio. (5) Prerequisite: ARCH7101. This design studio focuses on issues relevant to current architectural practice and/or exploration of architectural theory. Students choose from among several sections of this studio, each of which addresses a different set of issues. The issues addressed as well as the pedagogical approach of these studios are defined by the faculty teaching them. All students must take a minimum of one Topical Design Studio within their area of Concentration. *(Spring)*

ARCH 7103. Topical Design Studio. (5) Prerequisite: ARCH7102. This design studio focuses on issues relevant to current architectural practice and/or exploration of architectural theory. Students choose from among several sections of this studio, each of which addresses a different set of issues. The issues addressed as well as the pedagogical approach of these studios are defined by the faculty teaching them. All students must take a minimum of one Topical Design Studio within their area of Concentration. *(Fall)*

ARCH 7104. Thesis Studio. (8) Prerequisite: ARCH7103. This studio offers support and structure for students undertaking their individualized thesis project in either the MArchI or the MArchII program. For MArchI students, this studio will focus upon an individually defined architectural design project; for MArchII students, this studio will focus upon an individually defined research project (see Requisite & Capstone Experiences for more details). The faculty member teaching ARCH7104 coordinates the activities of the students and their advisory committees. *(Spring)*

Core Courses

ARCH 5112. Professional Practice. (3) This course serves as an introduction to the objectives of the practice of architecture, its responsibilities and procedures, and emerging alternative forms of practice and as they pertain to the role of the architect. *(Spring)*

ARCH 5211. Architectural History I. (3) This course is a survey of the theoretical, technical, and cultural background of architecture and urban design from prehistory to 1750. *(Fall)*

ARCH 5212. Architectural History II. (3) Prerequisite: ARCH5211. This course is a survey of the theoretical, technical, and cultural background of architecture and urban design from 1750 to present. *(Spring)*

ARCH 5312. Architectural Materials. (3) This course introduces the quantitative and qualitative characteristics of architectural materials, systems, and processes. Students will be introduced to the physical properties of materials relevant to their application in construction, assembly, and detail systems. Topics will include masonry, concrete, wood, steel, glass, cladding, and roofing and flooring materials and their assemblies. *(Spring)*

ARCH 5313. Structures One. (3) Prerequisite ARCH5312. This course introduces issues relevant to the fundamentals of structures including statics, strength, and stability of materials. Students will be introduced to structural concepts, systems, and the tracing of structural loads through basic principles, physical modeling, and theoretical and analytical methods. Topics will include interrelationship between strain, stress, and stability, as well as the implications of tension, compression, shear, torsion, and bending. *(Fall)*

ARCH 5314. Structures Two. (3) Prerequisite: ARCH5313. This course introduces specific structural applications of wood, steel, concrete, and masonry systems commonly used in small-scale commercial/institutional buildings. Students will be introduced to the design of beams, columns, walls, joinery, and connections appropriate to each material type through theoretical, analytical, and computer simulation methods. *(Spring)*

ARCH 5315. Environmental Control Systems. (3) Prerequisite ARCH5312 and co-requisite ARCH5313. This course introduces qualitative and quantitative analytical methods commonly used to assess the impact of environmental forces on occupant thermal and luminous comfort, energy performance, and regional sustainability. Students will be introduced to the interplay between climatic events, patterns of building use, and the

architectural variables that inform the appropriate application of building systems technology. Topics will include building envelope performance, and the introduction of passive and mechanical systems for heating, cooling, illuminating, and ventilating buildings. *(Fall)*

ARCH 5317. Building Systems Integration. (3) Prerequisites: ARCH5314 and ARCH5315. This course will introduce a set of advanced issues related to the comprehensive, systemic integration of building technology systems commonly used in large-scale buildings through case study, analytical, and simulation methods. Topics will address the resolution of building structure, materials, environmental systems, mechanical systems, electrical systems, life safety, building water supply and waste, and conveying systems in building design. *(Fall)*

ARCH 5601. Ideas in Architecture. (3) Prerequisite: ARCH 5050. Corequisite: ARCH6111. This seminar class concentrates on fundamental concepts, issues, and working knowledge specific to design in architecture. It is intended to complement the design problems encountered in ARCH6111 (studio) and to serve as a critical platform to raise issues that are not always evident in studio making alone. Primary topics addressed include order, form and space, site, type, and architectural meaning. *(Fall)*

ARCH 6151. Design Methodologies. (3) This course focuses on examination of analytic and synthetic models including information processing, programming, and implementation activities used to structure the architect's design process, conjectural models, and methods specific to the architect's creative skills. *(Spring)*

ARCH 7110. Summer Study Program. (6) Prerequisite: completion of the first two years of the COA MArchI Program (or equal). There are three study options for ARCH7110 that MArchI students may engage in the summer prior to their final year: Research, Independent Design, and International Study. The premise of this course is to allow graduate students to tailor a summer experience to support their growing knowledge of architecture and architectural discourse. This experience is intended to inform and motivate possible interests that the students might pursue in their final year of study. *(Summer)*

ARCH 7111. Research Document. (3) This course provides structure for the formation and exploration of the ideas and issues relevant to the thesis project in either the MArchI or MArchII programs. This project is to be undertaken individually by students in their final year of study. This course results in the documentation of relevant research in preparation for the execution of the project, which is carried out in ARCH7104. *(Fall)*

ARCH 7120. Graduate Summer International Study. (5) Prerequisite: completion of first year of the MArchII Program (or equal). ARCH7120 is an optional International Study course that MArchII students may engage in the summer prior to their final year. The premise of this course is to allow graduate students to engage a summer experience abroad to support their growing knowledge of architecture and architectural discourse. This experience is intended to inform and motivate possible interests that the students might pursue in their final year of study. *(Summer)*

ARCH 7950. Graduate Summer Research Study. (3) Prerequisite: completion of first year of the MArchII Program (or equal). ARCH7950 is an optional opportunity for research that MArchII students may engage in the summer prior to their final year. The premise of this course is to allow graduate students to engage research activities to support their growing knowledge of architecture and architectural discourse. This experience is intended to inform and motivate possible interests that the students might pursue in their final year of study. *(Summer)*

Concentration Electives

Concentration Electives are those non-studio courses that fulfill the requirement for coursework within a student's chosen area of Concentration. Possible areas of Concentration are 1.) Architectural Design, Theory, & Practice, 2.) Urbanism, and 3.) Architectural Technology. Three non-studio courses in the student's chosen area of Concentration are required to complete the curriculum. (See current College of Architecture Prospectus for a complete listing of courses.)

Architectural Design, Theory, & Practice

ARCH 6050. Objects and Analysis. (3) Prerequisite: ARCH4050 (Furniture Making) or ARCH4050 (Making Simple Tools). This course is an examination of the identity of objects and furniture in relation to ritual and space. Through coursework students will develop a historical ground and analytical methods that will extend into the making of an object. This making will involve the exercise of fine craftsmanship in a combination of media.

ARCH 6050. Architecture/Culture/Discourse. (3) This course traces ideological movements that have informed the discipline of architecture both past and present. In this sense, this course provides a historical vantage point from which to view how theories of architecture and the city develop as inter-related ideas, practices, and traditions through the persistence of specific themes over time and space.

ARCH 6050. Methods and Meaning. (3). This course examines a range of architectural ideas with an emphasis on developments from the late 1960s to the present. Attention will be paid to the interrelation between theory and practice and how clusters of ideas formulate the discourse as trends both mainstream and marginal.

Emphasis will be placed on texts and their interpretation alongside examples of work inspired by the same. This survey means to formulate a broad understanding of contemporary architectural culture.

ARCH 6050. Representation: Exploits of the Architectural Image. (3) This course offers an exploration of design themes in the two-dimensional, image-based world of the architect. It defines contemporary architectural representations and surveys ideas that center on drawing in architectural practice.

ARCH 6050. The Art of Technology. (3) This course engages the innovative, artful use of materials and technology and their underlying design theories/principles. Using the case studies, the course critically explores the design principles and theories of this century's leading designers who use materials and technology to create a new, more responsive, more provocative architecture.

ARCH 6050. Form Z (3-D computer modeling). (3) As the profession of architecture becomes increasingly computer reliant, the need to acquire skills and proficiency to operate computer aided drawings applications, becomes a necessity. This course will explore Form Z - a three-dimensional modeling program.

ARCH 6050. Animated Design Methods. (3) This course is collaboration between the College and a group of young architects in Charlotte who have demonstrated skills in integrating design with the use of FormZ as well as other sophisticated computer programs. The course will begin with a series of workshop introducing advanced capabilities in FormZ, Cinema 4D and Poser. The bulk of the course will be individual collaborations between young practicing architects and students on a invited design competition for interventions in Charlotte that will be displayed on a web site as well as video kiosk installations at the Mint Museum of Craft + Design and other sites.

Urbanism

ARCH 6050. Urban Settlements. (3) An urban settlement, for the purposes of this course, is a city, town or a part of either, in which inhabitants live, work, learn, recreate and worship in close proximity to one another. To make a building is to make a constituent part of a settlement. To make a settlement is to consider the location, form and meaning of its constituent parts both as positive forms (masses) and the interstitial spaces (voids) they make This course will explore the discipline of Urban Design as an extension of the disciplines of both Architecture and Landscape Architecture.

ARCH 6050. Community Planning Workshop. (3) This course serves to acquaint students with contemporary theory and practice in planning and urban design; to give students experience in applying planning and urban design theory and methods to actual problems; to provide students with experience in compiling and analyzing community scale data, working with citizens, professional planners and designers, and elected officials, to provide students with experience in the preparation of oral reports and technical documents; and to examine what it means for the planner and urban designer to demonstrate ethical responsibility to the public interest, to clients and employers, and to colleagues and oneself.

ARCH 6050. Shaping The American City. (3) Throughout the Twentieth Century urban politics, policies, and programs have shaped the space of the American City, including the architecture of urban settlement patterns, public space, transportation, and housing. An understanding of the political/social/historical/spatial foundations of urban policies in relation to the American City is critical in understanding the development of our current urban patterns, the spatial distribution of people and resources, and the future production of architecture and design in urban settings. Issues will be framed in the interstices of the space/knowledge/power triad.

ARCH 6050. Strategies for the Public Realm. (3) Contemporary theories and practices in urban design underscore the connection between the citizen and the public realm and between the physical and social attributes of the city. Urban design is not so much an aesthetic as it is a strategy for change, transformation, dialogue, and interaction. Urban design is the link between architecture and urbanism, tying together the city's disparate parts and celebrating the complexity and connectedness of space.

ARCH 6050. Dilemmas of Modern City Planning. (3) The patterns of man's settlement are predicated upon particular paradigms of urbanism, as well as more pragmatic concerns of politics, economics and geography. An examination of these influences and their interconnections provides the necessary theoretical and historical background from which to propose improvements to the contemporary landscapes of our cities.

ARCH 6050. Real Estate Development Studies: Introduction to Real Estate Development. (3) The production of buildings requires both architectural and economic skill. Likewise, the production of our landscape is both a private and public endeavor. To balance these skills and endeavors requires an understanding of basic facts. This course focuses on an introduction to the real estate development process. Course material, lectures and case studies focus on the identification and evaluation of critical assumptions and issues related to market and site feasibility, financial feasibility, planning, acquisition, construction, and operation of economically viable commercial real estate projects

ARCH 6050/4213-U01/6133. Public Space in Cities. (3) The public realm has historically constituted a set of

real places possessing physical form and has been the setting for civic and communal life. This traditional role of public space is brought into question by the advent of cyberspace, with unknown consequences for city form. This course focuses on the origins and transformations of public space within American culture, and to understand principles of urban design as they have related to the creation of public space during different historical periods. Course material will also focus on the historical connection between the public realm and democratic principles, and the threats to the continued existence of truly public space in American cities.

ARCH 6050. Urban Form, Context and Economics. (3) Urban development and redevelopment can be considered typologically in two main categories: large "catalyst" projects (performing arts centers, entertainment complexes, and other large, mixed-use projects); and smaller, incremental interventions in the urban setting that lack glamour but contribute much needed depth and complexity to the urban environment. This course focuses on how and why urban projects are formulated by public and private interests. It engages the conceptual origins, design development and production of urban projects large and small, in an effort to understand the relationship between development economics, social factors, program development, design concepts and urban contexts.

ARCH 6050. The Changing Urban Landscape: The Development of Uptown Charlotte, 1875-2000. (3) The design and evolution of cities is a reflection of evolving attitudes about gender, race, crime and socioeconomic conditions as well as governmental interventions and the efforts of private enterprise. Charlotte's center city is a unique result of those many influences and serves as an excellent laboratory for gaining an understanding of the forces that shape the making of the places we live. This class will explore the historical growth of Charlotte through the eyes of city leaders who have lived through it. Specific topics will include the development of First Ward from a public housing ghetto to a mixed income neighborhood, the demise of the Brooklyn neighborhood in Second Ward, professional sports in uptown Charlotte, the development of Fourth Ward, the civic patron/ corporate factor, transportation in uptown Charlotte and finally, the 2010 Plan for uptown.

ARCH 6050. Mayors' Institute on City Design / South. (3) The Mayors' Institute on City Design is comprised of a series of symposia on city design. At each meeting of the Institute, mayors and designers discuss specific problems facing cities and examine a broad range of design ideas, examples from other cities, and strategies to make improvements. Each student will be assigned a mayor and a city with which to work and will develop a case study for that city. Whenever possible, students will make site visits and help determine how the design arts can benefit the development of their particular city. The goals of the course are to familiarize students with the basic techniques of urban analysis and principles of urban design; introduce students to the interrelationships between urban form, building use and transportation, economics, and politics; consider the role of the public in civic design; and consider strategies for a more sustainable and ecologically appropriate urban architecture.

Architectural Technology

ARCH 6050. Parametric Methods: Notes on Sustainable Design Decision Making. (3) A formal design decision- making process is developed in this course through the elaboration of the systemic principles that describe the role of architecture to reconcile the pertinent utilization of mechanical, electrical and material system choices. Issues of the implicit role of the architect to understand the application of appropriate building systems technology, public policy decisions and economic solutions that provide for the sustained delivery of human, environmental and physical performance are brought to bear through a variety of methods.

ARCH 6050. Bio-climatology & Cross Cultural Assessments of Traditional Built Form. (3) Through this course a conceptual framework of social and technical determinism is developed from a single disciplinary point of view based on the traditions of building design science and environmental technology informed through social science theory. Topical field assessments will be developed through a research-based introduction of the Human Relations Area Files to address the cultural/societal and technical realms that describe traditional built form. The issues that have influenced and are currently impacting human settlement, building, and tectonic design are explored through the use of the Mahoney Tables to weave the relevant connections to built formal response and the interpretation of climatically responsive architectural principles of design sustainability.

ARCH 6050. Architectural Luminous Environment. (3) The architectural luminous environment is introduced in this course as a continuum of technical/material innovation from 1850 to the present. Issues of daylighting and electric lighting are explored as an integrated systems approach to evaluate current sustainable design practices that relate to energy utilization and appropriate resource allocation. Case study research methods of assessment, computational analysis, physical modeling and economic evaluation will be introduced.

ARCH 6050. Sustainable Design: Ecology, Technology and Building. (3) Sustainable design is the term most commonly used when describing building carried out according to sound ecological and environmental perspectives. Utilizing a lecture/seminar/case study format the course content will survey the principles of environmentally sensitive design, review case studies of "green building" applications, and

explore various concepts for integrating sustainable planning and building principles into the form making process of architectural design. The process includes an analysis of bioclimatic comfort, climate responsive design, integration of passive heating and cooling systems, and the basis for specifying sustainable building materials. The intention of the course is to develop a general understanding of the fundamental principles underlying sustainable design and the impact on the building design process and built form.

ARCH 6050. The Nature of Architecture and the Architecture of Nature. (3) How does the nature of Architecture relate to the architecture of Nature? Clearly, acts of construction have always had some relation to and impact upon the natural settings in which they have occurred. Given the dynamic relation between building and natural conditions (including the "architecture" of climate, material, fauna and flora), societies jointly formulated their understanding of the relation between architecture and nature. Similarly, society's contemporary interpretation of this relation is rooted in traditional building habits and rituals. Thus, in order for young architects to be in a position to influence society's future building habits, especially as they pertain to "sustainable architecture," they must first recognize and appreciate the rich cultural ramifications entailed in perceptions of the nature of Architecture and the architecture of Nature.

ARCH 6050. Building Envelopes. (3) Just like our skin, a building envelope can regulate a building's internal and external environments. The building envelope is also the single most visible component of a building and it is this aspect, which is dealt with comprehensively throughout an architect's formal education. This elective is dedicated to addressing the connections, which exists between form and technology by examining the technical properties, and principles of building skins in a way which will better inform architects to design environmentally and aesthetically sensitive buildings.

Architectural History Electives

Architectural History electives offer a topical study of issues or areas of history. These courses complement the architectural history survey courses (ARCH5211/5212), and serve to inform and develop in-depth research, writing, and presentation skills. One Architectural History Elective course must be taken during the first year of study for MArchII student and during the second year of study for MArchI students. Additional Architectural History Elective courses may be taken as desired. These courses do not count towards completion of Concentration requirements unless cross-listed. Cross-listed courses are marked with an asterisk (See current College of Architecture Prospectus for a complete listing of courses.)

ARCH 6050. The Architecture of the Italian Renaissance. (3) This course will examine the history of architecture in Italy during the Renaissance. This study will include issues such as the aesthetic program of Renaissance architecture and attitudes toward the Roman classical past, new architectural theories, and architectural space, technology, and urban planning.

ARCH 6050. Renewing the Modernist Debate: The Theory and Works of Adolf Loos. (3) At the beginning of the 21st century, architecture finds itself in a state of uncertainty and change. Like 100 years before, architects are pursuing ways of reconfiguring the aesthetic, technical, and social demands of their profession in hopes of establishing legitimacy in their work. This class will investigate the buildings and ideas of the early 20th century architect, Adolf Loos (1870-1933), as a vehicle to come to grips with our own precepts about modern architectural theory and practice.

ARCH 6050. Histories of Latin American Architecture. (3) This course will survey the ways by which Latin American architectures (both north and south of the US/Mexico border) have come to be seen within the western canon. In this sense, this course is not purely historical; rather, the class will explore Latin American architectures chronologically but from a post-colonial perspective rooted in the present.

ARCH 6050. Popular Modernism: Charlotte Architecture in the '50's and '60's. (3) This course will investigate the influence of 1950s and 60s modern international architecture on Charlotte and the Piedmont region. The goals of the course are: (1) to probe deeper into why this type of architecture became popular in the region, in both its private and public iterations, and (2) to link this interest with similar developments in other American cities, and to discuss such developments within the context of international architecture of the same period.

General Architectural Electives

General Architectural Elective courses offer study of a wide range of topical areas in architecture. Students can choose from among many courses, each of which addresses a different topic. These courses complement the core courses and studios and allow students to pursue their specific interests. These courses do not count towards completion of Concentration requirements unless cross-listed. Cross-listed courses are marked with an asterisk. (See current College of Architecture Prospectus for a complete listing of courses.)

ARCH 6050. Watercolor & Representation I. (3) The practice of watercolor can make many design notions clear for the maker as well as the observer. This course introduces basic visual strategies utilizing tactics and techniques of watercolor. The class focus is on developing a practical vocabulary for skillful representation and emphasizes a working knowledge of watercolor painting and its application at all phases of design work. Students will develop skills presenting objects in space using watercolor and pencil.

ARCH 6050. Advanced Watercolor Representation. (3) This class emphasizes the development of working methods for thoughtful representation using watercolor for all phases of design work. Issues and skills addressed include analysis; representation of interior and exterior spaces and events; representation of urban context and site; and presentation of organizational strategies.

ARCH 6050. Furniture Making. (3) This is a laboratory course in the fundamentals of designing and building of furniture, primarily in wood. Included are the basics of materials selection, machine and hand tool use, joinery, and finishing. The crafting of furniture of student's design is an integral part of the course.

ARCH 6050. Form Z (3-D computer modeling).* (3) As the profession of architecture becomes increasingly computer reliant, the need to acquire skills and proficiency to operate computer aided drawings applications, becomes a necessity. This course will explore Form Z - a three-dimensional modeling program.

ARCH 6050. Animated Design Methods.* (3) This course is collaboration between the College and a group of young architects in Charlotte who have demonstrated skills in integrating design with the use of FormZ as well as other sophisticated computer programs. The course will begin with a series of workshop introducing advanced capabilities in FormZ, Cinema 4D and Poser. The bulk of the course will be individual collaborations between young practicing architects and students on a invited design competition for interventions in Charlotte that will be displayed on a web site as well as video kiosk installations at the Mint Museum of Craft + Design and other sites.

ARCH 6050. Photocollagraphy. (3) A derivation of cartographic processes, it is not enough to define "mapping" in traditional terms of symbols, borders, geography, and human habitation. Instead, mapping as an architectural strategy utilizes photography, collage, and cartographic techniques to communicate in ways none of those fields can completely accomplish on their own. This course will investigate the potential relationships between architecture and photography, collage and cartography, looking specifically at the design process, analysis and abstraction, and the exploration and representation of ideas.

ARCH 6050. Leadership in Charlotte. (3) This is an intensive short course including both lecture and panel formats during which issues relevant to the development of Charlotte are explored. Issues include but are not limited to an exploration of leadership styles; building community, Charlotte and the arts, diversity, health care; law enforcement, etc.

ARCH 6050. Experimental Visions – Photography for Architecture Students. (3) Architecture is often seen as the intersection of art and science, a dual fulfillment of the visual, sensual, and intellectual with the structural and spatial. Successful photography as well attempts to bridge the shores of art and science. Both fields concern the creation of a world interpreted, a world created by the designer with unique purpose, unique point of view, unique qualities and vision. The objective of this class is to explore the potential relationship between photography and architectural design through photographic assignments and student presentations

ARCH 6890. Directed Independent Study.* (3) Prerequisite: permission of the Graduate Coordinator and the graduate faculty member advising the study. This course enables directed individual study and in-depth analysis of a special area related to the interests of the student and the expertise of the advising faculty member. May count towards completion of Concentration requirements if appropriate. *(Fall, Spring, Summer)*

College of Arts and Sciences

The College of Arts and Sciences is the largest of the seven colleges at The University of North Carolina at Charlotte, housing 21 academic departments and 8 interdisciplinary programs. The College serves the Charlotte region and the state of North Carolina and is engaged in the discovery, dissemination, synthesis and application of knowledge. It provides for the educational, economic, social, and cultural advancement of the people of North Carolina through on-and off-campus programs, continuing personal and professional education opportunities, research and collaborative relationships with the private, public, and nonprofit institutional resources of the greater Charlotte metropolitan region. The College offers a wide array of graduate programming including graduate certificate, Master of Arts, Master of Science, and Ph.D. programs.

Graduate Degree Programs

Master of Arts Administration
Master of Arts in Biology
Master of Arts in Communication Studies
Master of Arts in English
Master of Arts in English Education
Master of Arts in Geography
Master Arts in Gerontology
Master of Arts in History
Master of Arts in Liberal Studies
Master of Arts in Mathematics Education
Master of Arts in Psychology: Clinical/Community
Master of Arts in Psychology: Industrial/Organizational
Master of Arts in Religious Studies
Master of Arts in Sociology
Master of Arts in Spanish
Master of Public Administration
Master of Science in Applied Physics
Master of Science in Biology
Master of Science in Chemistry
Master of Science in Criminal Justice
Master of Science in Earth Sciences
Master of Science in Mathematics: Applied Mathematics/General Mathematics/Applied Statistics
Master of Science in Mathematical Finance (with the Belk College of Business Administration)
Master of Science in Optical Science and Engineering
Ph.D. in Applied Mathematics
Ph.D. in Biology
Ph.D. in History (with Aberdeen)
Ph.D. in Infrastructure and Environmental Systems (with the William States Lee College of Engineering)
Ph.D. in Optical Science and Engineering
Ph.D. in Public Policy

Graduate Non-Degree Programs

Certificate in Applied Ethics
Certificate in Applied Linguistics
Certificate in Cognitive Science
Certificate in Communication Studies
Certificate in Gerontology
Certificate in Non-Profit Management
Certificate in Technical/Professional Writing
Certificate in Translating and Translation Studies

APPLIED ETHICS

Department of Philosophy

Winningham 103
704-687-2161
http://www.uncc.edu/ethics/grad-cert-prog.html

Degree

Graduate Certificate

Coordinator

Dr. William Gay

Graduate Faculty

Marvin Croy, Associate Professor
Michael Eldridge, Lecturer
Stephen Fishman, Professor
William Gay, Professor
John Lincourt, Bonnie E. Cone Distinguished Professor in Teaching
Judith Presler, Associate Professor
Eddy Souffrant, Associate Professor
Rosemarie Tong, Mecklenburg County Medical Society Distinguished Professor in Heath Care Ethics

GRADUATE CERTIFICATE IN APPLIED ETHICS

The Graduate Certificate in Applied Ethics is of interest to three groups of students: (1) professionals working in areas of applied ethics; (2) students just beginning to explore graduate work in philosophy; (3) students in other master's and doctoral programs, such as biology, health administration, and public policy, who expect their careers to include work in applied ethics.

Additional Admission Requirements

A personal statement outlining why the applicant seeks admission to the program and two letters of recommendation.

Prerequisite Requirements

Bachelor's degree from an accredited institution and a minimum undergraduate GPA of 2.75.

Certificate Requirements

The Graduate Certificate in Applied Ethics requires the completion of 15 credits of graduate course work in philosophy. The coursework should be distributed as follows:

Theoretical courses (3 credits), drawn from the following:

PHIL6219	History of Ethical Theory
PHIL6272	Idea of Human Nature

Elective courses (9 credits), drawn from the following:

PHIL6229	Health Care Ethics and Law
PHIL6246	Language and Violence
PHIL6249	Philosophy of Technology
PHIL6233	Bioethical Issues and the New Genomics
PHIL6227	Feminist Theory and Its Applications
PHIL6241	Philosophy of Education

Concluding Project (3 credits), one of the following:

PHIL6851	Practicum in Philosophy
PHIL6855	Directed Readings/Research

Approval of the Philosophy Department Graduate Coordinator is required in order to substitute related courses offered by other departments and programs.

Advising

Dr. William Gay

Transfer Credit

Transfer credit is not accepted in the certificate program.

Courses In Philosophy

PHIL 5050. Topics in Philosophy. (1-3) Prerequisite: Consent of the department. In-depth treatment of selected problems and issues in philosophy. May be repeated for additional credit as topics vary. *(On Demand)*

PHIL 6050. Topics in Philosophy. (1-3) Prerequisite: Consent of the department. In-depth treatment of selected problems and issues in philosophy. May be repeated for additional credit as topics vary. *(On Demand)*

PHIL 6219. History of Ethical Theory. (3) Discussion of the traditional ethical theories articulated in philosophy, and their relationship to contemporary personal and professional ethics. *(Yearly)*

PHIL 6227. Feminist Theory and Its Applications. (3) Discussion of selected works in feminist thought across the disciplines, with the opportunity for students to develop original research in an area of interest. *(Alternate Years)*

PHIL 6229. Health Care Ethics and Law. (3) Explores the relationship between ethical and legal aspects of controversial issues in health care. *(Alternate Years)*

PHIL 6233. Bioethical Issues and the New Genomics. (3) Discussion of new genetic technologies and their ethical implications. *(Alternate Years)*

PHIL 6241. Philosophy of Education. (3) Exploration of modern philosophies of education, with a focus on the relationships between pedagogy and society. *(Alternate Years)*

PHIL 6246. Language and Violence. (3) Explores philosophical theories on the relationship between language and violence, on a continuum from subtle forms of covert personal violence to grievous forms of covert institutional violence. *(Alternate Years)*

PHIL 6249. Philosophy of Technology. (3) Examines philosophical views on the nature of technology, focusing on its effects on society and nature. Computer technologies and other cases will be considered. *(Alternate Years)*

PHIL 6272. Idea of Human Nature. (3) Explores whether there is such a thing as human nature, and creates a dialogue among different conceptions of human nature. Philosophical theorizing will be informed by readings from philosophy, religion, psychology, biology, multicultural studies and gender studies. *(Yearly)*

PHIL 6851. Practicum in Philosophy. (3) Offers advanced graduate students an opportunity to explore in practice ideas they have studied in the classroom through internships and applied research projects. *(Alternate Years)*

PHIL 6855. Directed Readings/Research. (3) Offers advanced graduate students an opportunity to conduct independent readings and research. *(Alternate Years)*

PHIL 7999. Residency Credit. (1) Continuation of individual Concluding Project or Thesis for students completing the program but not enrolled in other graduate courses. *(Each Semester)*

PHIL 8050. Topics in Philosophy. (1-3) Prerequisite: Consent of the department. In-depth treatment of selected problems and issues in philosophy. May be repeated for additional credit as topics vary. *(On Demand)*

ARTS ADMINISTRATION

Department of Art
173 Rowe Building
(704) 687-2473
www.art.uncc.edu

Degree
Master of Arts

Director
David A. Edgar

Graduate Faculty
Lili Bezner, Associate Professor
David A. Edgar, Associate Professor
Alan Freitag, Assistant Professor
Jeff Murphy, Assistant Professor
Gary R. Rassel, Associate Professor
Gregory A. Wickliff, Associate Professor

MASTER OF ARTS IN ARTS ADMINISTRATION

The design of the M.A. in Arts Administration is based on the underlying belief that successful arts administrators must be familiar with both the practical and theoretical contexts of the visual arts. The program offers professional and academic training in the administration and leadership of visual arts organizations through balanced interdisciplinary course offerings from the Department of Art (which administers the program), the Master of Public Administration program, Department of Communications Studies, and other University resources. The M.A. in Arts Administration program serves students who need to acquire professional knowledge preparing them to be effective arts leaders and managers, whether established professionals seeking to broaden existing skills, newcomers seeking future employment, artists starting their own organizations, or others seeking professional arts administration experiences. Students may enroll in the M.A. in Arts Administration program on either a full-time or part-time basis.

Educational Objectives
1) To provide the tools and skills leading to significant professional competence and career enhancement in arts administration by preparing students for leadership positions in various international, national, and regional public, private, and corporate arts organizations including museums and galleries, community non-profit organizations, and arts foundations.
2) To prepare and sensitize students for the expert handling, care, research, and presentation and exhibition to the public of tangible art objects through hands-on experiences, such as internships and staging exhibitions.
3) To teach and encourage responsible fiscal management, fundraising, promotion and public relations, marketing and development.
4) To develop and enhance each student's ability to promote the arts ethically and responsibly to a broader public while developing sensitivity to a region's cultural needs and community issues.
5) To develop an appreciation and understanding for the diversity of artistic expression and its roles in contemporary society at both practical and theoretical levels.

Additional Admission Requirements
An undergraduate degree with a major in an arts field (art history, museum studies, studio practice, etc.) and/or significant experience in an arts related field is preferred. An interview with the Arts Administration Program Director is recommended. Any determined deficiencies in undergraduate coursework will need to be made up during the first year. Applicants who fail to meet any of the minimal requirements may request an interview with the program Director and/or admissions committee; the decision of this committee is final.

Admission to the M.A. in Arts Administration program requires:
1) A complete application package to the Graduate School at UNC Charlotte including (among other requirements): official transcripts from all post-secondary institutions attended; an essay describing the applicant's experience and the objectives in undertaking graduate study (see #6, below); and three letters of reference.
2) 9 or more credit hours (three courses minimum) of undergraduate courses in art history, including Art History Survey (two semesters) and Contemporary Art.
3) 9 or more credit hours (three courses minimum) of undergraduate courses in studio art; or, demonstrable, discipline-based expertise in one art area (may be documented by portfolio); or, (for those without substantive studio experience), approval of the M.A. in Arts Administration program Director and/or admissions committee.
4) Acceptable scores on the Graduate Record Examination or Miller Analogies Test
5) Acceptable scores on the TOEFL test if English is not the applicant's native language (557 on the written test; 220 computer based test).
6) Essay exemplifying excellent writing and communication skills to be evidenced by the Graduate School's required essay for admissions (and, if applicable, by an interview with the program Director). This essay should address the applicant's statement of purpose for enrolling in the M.A. in Arts Administration, research interests, career or professional goals, and how the applicant hopes to expand the enlightenment that the arts can offer.

Degree Requirements

The Master of Arts in Arts Administration program allows students, in consultation with the program Director and advisors, to tailor an individual program of study within a diverse selection of offerings. A minimum of 40 credit hours is required to complete the program, including 22 hours of core courses all students must complete, 9 hours of elective courses, at least one 3 credit hour internship, and 6 hours of thesis credits. The degree of Master of Arts in Arts Administration is awarded for completion of scholarly research that advances knowledge in the field. Evidence of this is demonstrated by a successful thesis defense demonstrating mastery of relevant subject matter, among other criteria.

Core Courses (22 credit hours)

MAAA6001 Introduction to Arts Administration (3)
MAAA6100 Curatorial Theory and Exhibition Design (3)
MAAA 6125 New Technologies for Arts Organizations (3)
MAAA 6150 Law and the Arts (1)
MAAA 6160 Marketing for the Arts (3)
MAAA 5212 Contemporary Art Theory and Criticism (3)
MAAA/MPAD6311 Non-Profit Management (3)
MAAA/MPAD6324 Financial Analysis for Government and Non-Profit Organizations (3)

Elective Courses (9 credit hours; to be chosen and designed in consultation with advisor and/or program Director; only 6 hours of electives may be taken at the 5000 level. All other coursework must be taken at the 6000 level or above)

MAAA7100 Communication for the Arts (3)
MAAA7150 Education and Arts Administration (3)
MAAA7300 History and Theory of Art Museums (3)
MAAA7700 Topics in Arts Administration (1-3)
COMM6146 Media Relations (3)
COMM6145 Communication Campaign Management (3)
COMM5102 Federal Interpretation of the First Amendment (3)
COMM/MPAD6170 Communication Law and Policy (3)
MPAD6134 Human Resources Management (3)
MPAD6131 Public Budgeting and Finance (3)
MPAD6142 Managing Grants and Contracts in Public and Nonprofit sectors (3)
ANTH5120 Intercultural Communications (3)
ENGL5182 Writing and Designing Computer Based Documents (3)
MPAD6320 Strategic Planning for Nonprofit Organizations (1)
MPAD6321 Resource Development in Nonprofit Organizations (1)
MPAD6322 Volunteer Management (1)
MPAD6323 Grantwriting (1)
MPAD6325 Legal Aspects of Nonprofit Organizations (1)

Internship

MAAA7800 Internship (3)

Thesis

MAAA 7990 Thesis I (3)
MAAA 7991 Thesis II (3)
MAAA 7999. Master's Graduate Residence (1) (As necessary)

Admission to Candidacy Requirements

1) Upon completion of 18 hours of coursework for the M.A. in Arts Administration, the student's performance will be evaluated by the program Director, who will notify the student of the Department's approval of his or her continuation in the M.A. program.
2) Upon completion of 18 hours of coursework, the student can apply for admission to Candidacy through the Graduate School.
3) Students are required to complete an "Application to Candidacy" form no later than the first week of the semester they wish to graduate. This form lists all courses to be counted toward the degree. It should be signed by the student and returned to the M.A.A.A. program office.

Internship

All students must complete at least one supervised and approved field experience with a visual arts organization. For those with extensive previous professional arts administration experience, this credit could be waived (and used for elective credit). For those currently employed in an arts organization, this credit could be earned at the place of a student's employment, as long as it is not simply an extension of regular duties but exposes the student to different kinds of challenges. One 3 credit hour internship is based on completing 120 contact hours of work in a 15 week period at the host institution.

Capstone Experiences

All students must present a written thesis (written using a format acceptable to the Graduate School) to the Advisory Committee. The student must defend the thesis at a presentation before the M.A.A.A. faculty.

Advising

Each student is assigned an advisor and given program guidelines when admitted to the program. The advisor is a member of the M.A.A.A. faculty. Students should meet with their advisors and/or the program Director to develop a schedule each semester before registering.

Transfer Credit Accepted

Up to six credit hours may be transferred to the Arts Administration program from another institution. Only

courses with grades of A or B, earned in a graduate program accredited by the Southern Association of Colleges and Schools or other similar agency, may be accepted for transfer credit. Transfer credit is not automatic and requires the approval of the program Director and the Dean of the Graduate School.

Language Requirement

The program has no language requirement. However, if a student seeks an internship in a country wherein English is not the primary language (or uses a language with which the student has no proficiency), he or she must take appropriate language classes in order to prepare for this experience. These foreign language courses do not count as graduate credits. Each student's individual language needs will be negotiated with the program Director.

Comprehensive Examination

After admission to candidacy, each student must successfully complete a comprehensive examination (and must be enrolled during the semester in which they take the examination).

Thesis

All students must complete thesis (capstone) requirements consisting of two courses (Thesis I, MAAA 7990 and Thesis II, MAAA 7991), 3 credit hours each, over the last two semesters. The Thesis is the final portion of degree work; it provides an opportunity to accomplish substantial professional work which focuses on each student's professional interests and expertise, and culminates in a public defense of the thesis project. Students choose between three options, in consultation with the program Director and advisors, to suit their individual interests:

1) planning and executing an exhibition (on-campus or at another art space in Charlotte or the region) accompanied by a written thesis explicating the project;
2) planning and executing an administrative/research project (which may be accomplished in the context of an internship) accompanied by a written thesis explicating the project; or
3) conducting original research which is presented in the form of a written thesis.

Other Requirements

Students are required to maintain continuous registration (fall and spring semesters) for thesis work until its completion. Continuous registration begins the semester in which approval for the thesis topic is received. Students have a maximum of six years to complete all requirements.

Grade Requirements: Students are expected to achieve A's or B's in all course work taken for graduate credit and must have at least an average of B in order to graduate. Internships and theses are graded on a Pass/No Credit or Pass/Unsatisfactory basis and, therefore, will not be included in the overall assessment of cumulative average. The program Director evaluates the record of any student who receives a course grade of C or less or whose grade point average falls below a 3.0. On the basis of this evaluation and in conjunction with policies in the Academic Regulations/Degree Requirements section of this *Catalog*, the student may be placed on academic suspension or terminated from the MAAA program. An accumulation of more than two grades of C will result in suspension of the student's enrollment in the graduate program. If a student makes a grade of U for any course, enrollment will be suspended and the student cannot take any further graduate course work without being readmitted to the program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the program Director.

Application for Degree

Students are also required to file an "Application for Degree" with the Registrar's Office in the semester prior to the one in which they plan to graduate.

Financial Assistance

Awards are available on a competitive basis through the Graduate School. Several administrative units on campus also employ graduate students. Other forms of financial aid, such as loans, are available; contact the Financial Aid Office at 704-547-2461 for further information.

Courses in Arts Administration

MAAA 6001. Introduction to Arts Administration. (3) Recognizing the breadth and complexity of career options in art administration, the purpose of this class is to orient students to the basic profiles of organizational activities within the visual art field. Students will be given a broad overview of the fundamentals of administrative structure, standards of operation, and functional components that are found in various visual art organizations. They will have the opportunity to explore, discuss and understand the principles of successful art organization management. *(Fall) (Evening)*

MAAA 6100. Curatorial Theory and Exhibition Design. (3) This course introduces students to the evolving, diverse principles of curatorial practice and design. Topics include: research methodologies; formations, acquisitions and management of collections; and their use for aesthetic, educational and research purposes. It also examines: the roles of professionals who care for and use collections; ethics; cataloging and registration; loans; issues of interpretation to the public; and accessibility (both physical and intellectual). *(Yearly) (Evening)*

MAAA 6125. New Technologies for Arts Organizations. (3) This course will survey the dynamic field of current and developing technologies as they relate to the administrative aspects of an arts organization.

Course content will address development of Web Sites, CD-ROMs and DVDs as well as the basics of digital imaging, image management, and video and audio technologies. Usability issues related to the World Wide Web as well as the principles of interactive and presentation design, virtual galleries and exhibition spaces together with developing technology plans will be investigated in the context of their use as methodologies for the effective implementation of new media forms. *(Alternating Years)*

MAAA 6150. Law and the Arts. (1) This course introduces students to the primary legal issues facing an arts administrator today, including some consideration of history and ethics. Topics explored include: artists' rights; freedom of expression, copyright, and trademark; cultural property (archaeological preservation, international protection of cultural heritage in war and piece, and indigenous cultures); and pressing legalities facing arts organizations. *(Alternating Years)*

MAAA 6160. Marketing for the Arts. (3) Recognizing the breadth and complexity of cultural organizations, the purpose of this class is to familiarize students with the fundamentals of marketing organizational programs and activities within the visual art field. Students will be given a broad overview of the functional components of administrative management and participation in the theory and techniques of public relations, audience development, market research, advertising and various promotional strategies. They will have the opportunity to explore, discuss and understand the principles of successful marketing for art organizations. *(Spring) (Evening)*

MAAA 5212. Contemporary Art Theory and Criticism. (3) This course surveys the major critical theories in recent art history and criticism of the 1980s to the present. This course demands a thoughtful, questioning, and open intellectual nature in order to be appreciated. This class will combine lecture, discussion and participation together with written assignments and exams. *(Alternating Years)*

MAAA 6311. Non-Profit Management. (3) This course examines the structure, function and administration of nonprofit organizations. Students will be taught the development of strategies to insure successful financial and ethical management. *(Alternating Years)*

MAAA 6324. Financial Analysis for Government and Non-Profit Organizations. (3) This course will cover the topics of fund accounting basics for government and nonprofit organizations, preparation and analysis of financial statements, evaluating and monitoring financial condition, capital budgeting and investment analysis, debt policy and management. *(Alternating Years)*

MAAA 7100. Communication for the Arts. (3) Students will be given a broad overview of the functional components of administrative management and participation in the theory and techniques of both written and oral communications for internal as well as external purposes in the context of management documents, promotional materials, grant proposals, exhibition signage, press releases, oral presentation and public speaking. They will have the opportunity to explore, discuss and understand the principles of successful communications for art organizations. *(On Demand)*

MAAA 7150. Education and Arts Administration. (3) This course examines the complexities involved in providing appropriate educational interpretation, content and programs for museums and other arts organizations. Recognizing that education is almost always a mission-critical aspect of public cultural organizations, students will explore how educational programming goals aid in both audience development and the artistic enrichment of the public audience.
(On Demand)

MAAA 7300. History and Theory of Art Museums. (3) This course will introduce students to the history, philosophy, practice and function of art museums. Students will research works of art and working relationships with living artists, artists' estates and both private and institutional collections. The roles and profiles of various visual art organizations both locally and nationally will be studied. *(On Demand)*

MAAA 7700. Topics in Arts Administration. (1-3) This course is designed to supplement existing program studies. Topics courses provide for: 1) the offering of classes not otherwise covered by the curriculum, and incorporation of specialized topics taught by practicing professionals; such classes offer the opportunity, as well, to explore a course's potential contribution to the overall curriculum before officially adding it to the curriculum. Samples of potential Topics courses include: Fundraising and Resource Development for Arts Administration, Managing Artists Residency Programs, Managing Public Art and Design Programs, Practical Aspects of International Art Business, and Collections Management. *(On Demand)*

MAAA 7800. Internship in Arts Administration. (3) A supervised internship with a credible and functioning arts organization. The primary objective is for students to acquire a meaningful work experience in a professional institutional arts setting. The 3-credit internship is based on the student completing 120 contact hours of work in a 15 week period. Permit Only *(Fall, Spring & Summer)*

MAAA 7990. Thesis I. (3) This course prepares the exiting MAAA student for execution of his/her Thesis, by providing students with the skills necessary to generate application-based research questions, critically evaluate research studies, construct research designs and generate

viable research proposals. Projects include learning appropriate research methods; making an outline/plan; creating an annotated bibliography; and forming a thesis statement. For those students planning an exhibition, this course would include developing a curatorial strategy, designing the exhibition, planning and obtaining work to show, insurance for the work, etc. Each student is signed off by the MAAA Program Director at every stage. Permit Only *(Fall, Spring)*

MAAA 7991. Thesis II. (3) This course facilitates the execution of the preparations achieved during Thesis I, under supervision of the Program Director and other faculty/professionals on the student's Thesis Committee. If the student is pursuing a written thesis, projects include researching, writing and producing the final paper. If the student is pursuing a public exhibition, projects include executing the exhibition and public relations writing, catalog/label copy, planning panel discussions, education, outreach etc. Each student will give a public presentation of his or her project as an oral exiting requirement for the course. Permit Only *(Fall, Spring)*

MAAA 7999. Master's Graduate Residence. (1) As necessary, this course provides a continuous enrolment status for degree candidates during completion of thesis or other program requirements. Permit Only *(Fall, Spring, Summer)*

BIOLOGY

Department of Biology
257 Woodward Building
704-687-2315
www.bioweb.uncc.edu

Degrees
M.S., M.A., Ph.D.

Coordinators
Dr. Todd R. Steck – Master's coordinator
Dr. Yvette M. Huet-Hudson – Doctoral coordinator

Graduate Faculty
Juan Anguita, Assistant Professor
Lawrence Barden, Professor
Rob Bierregaard, Adjunct Assistant Professor
Kenneth Bost, Professor
Mark Clemens, Professor
Didier Dréau, Assistant Professor
Michael Hudson, Professor
Yvette Huet-Hudson, Professor
Francis Monty Hughes, Associate Professor
Lawrence Leamy, Professor
Ian Marriott, Associate Professor
Iain McKillop, Associate Professor
James Oliver, Professor
Susan Peters, Associate Professor
Thomas Reynolds, Professor
Amy Ringwood, Assistant Professor
Stanley Schneider, Professor
Laura Schrum, Assistant Professor
Inna Sokolova, Assistant Professor
Todd Steck, Associate Professor
Christopher Yengo, Assistant Professor
Jian Zhang, Associate Professor

MASTER OF SCIENCE DEGREE IN BIOLOGY

The Master of Science degree program is designed for students who desire to pursue advanced studies in professional and graduate schools or various vocational opportunities in biology and related areas (see www.bioweb.uncc.edu/Masters/index.htm). The program provides the opportunity for broad training in a variety of biological areas as well as specialization in areas of particular interest to the student. The department has two areas of research strength: Biomedical/ Biotechnology, and Ecology/Environmental. Students also have the opportunity to conduct their thesis research under the direction of select faculty at the Carolinas Medical Center in Charlotte.

Additional Admission Requirements
In addition to the general requirements for admission to the Graduate School, the following requirements are specific to the Department of Biology:
Under most circumstances, students admitted to the program will have:

1) A B.S. or B.A. degree from an accredited university.
2) Evidence of undergraduate preparation in biology with a minimum 24 semester hours in biology and 24 semester hours of cognate study.
3) An overall grade point average of at least 3.0 out of 4.0. Additionally, applicants must have a grade point average of at least 3.0 in biology.
4) A score on the Graduate Record Examination General Test in at least the 50th percentile (average for the verbal, quantitative, and analytical writing sections).
5) A score of at least 220 on the computer-based Test of English as a Foreign Language (TOEFL) for applicants whose native language is not English. Students who do not pass this examination must pass ENGL 1100 (English as a Foreign Language) with a grade of C or higher. In addition, these students who will be involved in any instructional activity (e.g., teaching assistants) will be required to be evaluated by the English Language Training Institute at UNC Charlotte prior to the beginning of the first semester of study.
6) Three letters of reference, at least two of which must be from faculty members.

Degree Requirements

1. Total hours required. The program leading to the Master of Science degree in Biology requires the successful completion of 30 semester hours of course work approved by a supervisory committee.
In addition to course work, each degree candidate must pass an oral candidacy examination.

2. Proportion of courses open only to graduate students. At least 16 of the 30 required hours, including no more than eight hours of thesis research, must be in courses open to graduate students only.

3. Grades required. A student must maintain a cumulative average of 3.0 in all course work taken for graduate credit. An accumulation of more than two C grades will result in termination of the student's enrollment in the Masters program. If a student makes a grade of U in any course, enrollment in the program will be terminated.

4. Amount of transfer credit accepted. Up to 6 hours of transfer credit may be applied to the Masters degree. Only courses with grades of A or B may be accepted for transfer credit. Courses taken to satisfy the requirements of a previously completed degree can not be counted toward the Masters degree. All transfer credit must be approved by the Student's Supervisory Committee and the Graduate Coordinator.

5. Library workshop. All Masters students will be required to take the Library workshop offered each fall semester through the Department of Biology.

6. Departmental seminars. Graduate students are expected to attend all seminars sponsored by the Department of Biology.

7. Thesis. The candidate must prepare a thesis based upon original research acceptable to the Supervisory Committee and the Dean of the Graduate School. The student must orally present and successfully defend the thesis to the student's supervisory committee in a defense that is open to the public.

8. Teaching. Every student is required to be a teaching assistant for at least one class in one semester.

Admission to Candidacy

General academic regulations will apply to application for admission to candidacy. In addition to these the applicant should have:

1) Removed any identified entrance deficiencies by the time of application.
2) Successfully completed the candidacy examination.
3) Taken at least 15 hours of graduate work with a GPA of 3.0 or better.
4) Satisfied the supervisory committee that he/she is qualified to become a candidate, i.e., can fulfill the requirements successfully.

Assistantships

Teaching and research assistantships are available on a competitive basis for qualified students. A limited number of out-of-state and in-state tuition grants are also competitively awarded.

MASTER OF ARTS DEGREE IN BIOLOGY

The Master of Arts degree program is designed for students who choose to write a thesis based upon published scientific literature rather than on laboratory or field research (see www.bioweb.uncc.edu/Masters/index.htm).

Degree Requirements

Students who choose to pursue the Master of Arts degree must complete the requirements for the Master of Science degree with the following exceptions: at least 32 hours of course work. A maximum of four hours of credit for thesis research may be included in the required 32 hours, and three courses of the 32 hours submitted for the degree must include a formal laboratory.

INTERDISCIPLINARY PH.D. IN BIOLOGY
(Biomedical Science and Biotechnology)

The Interdisciplinary Ph.D. in Biology Program has as its intellectual focus a synthesis of the molecular and integrative bases of biomedical sciences and related biotechnology. In addition to a vigorous research concentration, the program emphasizes the importance of relevant course work. All students are required to complete a series of core courses that stress the interdisciplinary nature of the program. These courses expose students to the biological, chemical, physical, and engineering aspects of biotechnology and to the ethical implications of biomedical and biotechnological research. The cornerstone of the program is the student's research dissertation. Each dissertation is expected to be a significant scientific contribution based on independent and original research, leading to publications in national/international peer-reviewed journals.
For further information see our website which is updated regularly: www.bioweb.uncc.edu/doctoral

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for study toward the Interdisciplinary Ph.D. in Biology.

Under most circumstances, students admitted to the program will have:

1) A B.S. or B.A. degree from an accredited university.
2) An overall grade point average of at least 3.0 out of 4.0. Additionally, applicants must have a grade point average of at least 3.5 in biology, 3.0 in chemistry, and 3.0 in mathematics.
3) A score on the Graduate Record Examination General Test in at least the 65th percentile (average for the verbal, quantitative, and analytical sections).
4) A minimum of 24 hours in biology, which must include at least one course in each of the areas of genetics, physiology, and cell/molecular biology. Additionally, applicants must have one year each of general chemistry, organic chemistry, physics, and mathematics (at least one semester each of calculus and statistics). Applicants with academic deficiencies may be admitted on the condition that any deficiencies are corrected during the first year of graduate study. The Interdisciplinary Ph.D. Committee will determine the remediation necessary for identified deficiencies.
5) A score of at least 220 on the computer-based Test of English as a Foreign Language (TOEFL) for applicants whose native language is not English. Students who do not pass this examination must pass ENGL 1100 (English as a Foreign Language) with a grade of C or higher. In addition, these students who will be involved in any instructional activity (e.g., teaching assistants) will be required to be evaluated by the English Language Training Institute at UNC Charlotte prior to the beginning of the first semester of study.
6) Three letters of reference, at least two of which must be from faculty members.

Degree Requirements

The Ph.D. acknowledges the value of course work as background and preparatory for research, but the primary emphasis of the program is on the development of research skills and the completion of a research project on a significant problem in the area of biomedicine or biotechnology.

1. Total hours required.
The program requires 72 post-baccalaureate credit hours. Because of the interdisciplinary nature of this program, all students will be required to take a general curriculum that includes a two-year sequence of core courses as shown below:

Core A: 16 semester hours. Four team-taught semester-long courses in Principles of Biochemistry (Fall, 4 credits), Molecular and Cell Biology (Fall, 4 credits), Microbiology and Immunology (Spring, 4 credits), and Integrative Systems Physiology (Spring, 4 credits). These courses will provide the fundamental background for the applied focus of the program.

Core B: 12 semester hours. Four team-taught semester-long courses in Biophysics (Fall, 3 credits), Bioethics (Fall, 3 credit; PHIL 8050), Hypothesis Testing (Fall, 3 credits) and Biotechnology and Bioengineering (Spring, 3 credits). These courses will build on the material presented in Core A and will emphasize the chemistry, physics, and engineering principles as they impact biomedicine and biotechnology.

Years 1-4:
Interdisciplinary Colloquium; 4 semester hours (1 hour per year). This course brings together faculty and students from the participating programs in an informal discussion of interdisciplinary research. (Fall semester only).

Years 1-4:
Seminar; 4 semester hours (1 hour per year). Formal student presentations of current literature topics in their area of study. (Spring semester only).

Years 1 & 2:
Laboratory Research Rotations; a maximum of 6 semester hours total (3 rotations of 2 hours each). These hours will be earned in Year 1 and completed by the beginning of Year 2.

Years 2 & 3:
Electives; 8 semester hours minimum. Advanced topics courses to be selected by students in consultation with their dissertation committee. These will be specialty topics in the areas of expertise of program faculty.

2. Proportion of courses open only to graduate students.
All the basic core courses, interdisciplinary colloquium, and seminar classes are open to graduate students only. Lab rotations are restricted to doctoral students. At least 4 hours of the minimum 8 hours of electives must be in courses at the 8000 level or higher. The remaining 4 credit hours can be completed in any approved program electives.

3. Grades required.
A student must maintain a cumulative average of 3.0 in all course work taken for graduate credit. Lab rotations and the dissertation research will be graded on a Pass/Unsatisfactory basis and therefore will not be included in the cumulative average. An accumulation of two C grades will result in termination of the student's enrollment in the graduate program. If a student makes a grade of U in any course, enrollment in the program will be terminated.

4. Amount of transfer credit accepted.
Only courses with grades of A or B may be accepted for transfer credit. Although the maximum amount of credit past the baccalaureate degree that a Ph.D. student may count towards the doctorate is 30 semester hours, only courses appropriate for the program and curriculum in which the student is enrolled may be transferred. This

should be determined by the student's Dissertation Committee and approved by the program coordinator, before the request is submitted to the Graduate School. This rule applies whether the courses were taken at UNC Charlotte or elsewhere, and whether a master's degree was earned or not. However, no more than six hours taken when the student was in post-baccalaureate (non-degree seeking) status may be applied toward the doctoral degree.

5. Departmental seminars.
Graduate students are expected to attend all seminars sponsored by the Department of Biology.
In addition, each student is required to make a 20 min presentation on his/her research at the departmental seminar after entering his/her 2nd year in the program. He/she is required to make a 40 min presentation at the departmental seminar in his/her 3rd year into the program. The PhD coordinator will work out the logistics with the department seminar coordinator concerning the arrangement of students' presentations.

6. Advancement to candidacy.
For Advancement to Candidacy, a student must complete the following by the end of the 5th semester of study. First, the student must pass the Candidacy Examination. A dissertation topic will then be proposed to the student's Dissertation Committee. A student advances to candidacy following approval of the proposed dissertation topic by the student's Dissertation Committee and the Dean of the Graduate School.

7. Dissertation.
The doctoral program of study must include a minimum of 18 hours of dissertation credit. The student must complete and defend a dissertation based on a research program approved by the student's dissertation committee which results in a high quality, original and substantial piece of research. The student must orally present and successfully defend the dissertation to the student's dissertation committee in a defense that is open to the public. A copy of the dissertation must be made available for review by the program doctoral faculty at least two weeks prior to the public defense.
A paper reporting results described in the dissertation shall be included in the dissertation (e.g. in an appendix). The paper may be published, accepted for publication, submitted for publication, or a draft following the guidelines of a journal to which the results will be submitted.

8. UNC Charlotte residency requirement.
The student must satisfy the UNC Charlotte residency requirement for the program by completing 20 hours, either as course work or research credits. Residence is considered to be continuous if the student is enrolled in one or more courses in successive semesters until 20 hours are earned.

9. Laboratory research rotations.
Laboratory research rotations allow the student to sample areas of research and become familiar with program faculty. A student will engage in a minimum of 1 rotation with a maximum of 3 rotations. Each rotation will consist of a minimum of 4 weeks and there is no expectation that the work done during the rotation will result in a publication. By the end of the student's second semester he/she must have determined their major advisor. A rotation must have been completed in the advisor's laboratory.

The purpose of a laboratory rotation is to learn and perform techniques associated with the lab, and to potentially identify a Dissertation Advisor. A typical rotation will involve 5-10 hours per week in the laboratory for 4-10 weeks. Students are encouraged to identify a sponsoring faculty member well in advance of the scheduled rotation. Students must meet with the sponsoring faculty member to determine what will be done during the rotation, i.e. techniques to be learned and identification of the project to be completed. At the end of the rotation the student must write a one page synopsis of the rotation to be signed by the sponsoring faculty member and turned in to the Ph.D. coordinator.

10. Deadlines
1) A student must establish their graduate committee by the end of the 3rd Semester
2) The student and graduate committee must meet by the end of the 4th Semester to set timeline for candidacy exam.
3) The student is required to meet with their graduate committee at least once a year
4) The deadline for completing the candidacy exam is the end of the student's 5th Semester.

11. Time limits for completion.
All requirements for the degree must be completed within eight years after first registration as a doctoral student. The student must achieve admission to candidacy within six years after admission to the program and complete all requirements within six years after admission to candidacy for the Ph.D. degree. These time limits are maximums; students will typically be expected to complete the degree requirements within five years.

Courses in Biology

BIOL 5000. Advanced Topics in Biology. (1-4)
Courses in selected topics and advanced studies in biology. Lecture and laboratory hours will vary with the topics taught. May be repeated for credit as topics vary. *(Fall, Spring)*

BIOL 5111. Evolution. (3) Theories of evolution and forces which affect gene frequencies. *(Fall)*

BIOL 5121. Biometry. (4) Prerequisite: one course in statistics. Design and analysis of experiments. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 5144. Advanced Ecology. (4) Energy flow, nutrient cycles, community structure, population growth and regulation. Three lecture hours and one laboratory period of three hours a week. *(Fall)*

BIOL 5168. Recombinant DNA Techniques. (3) Modern molecular biological methods (such as DNA cloning, gel electrophoresis, nucleic acid hybridization, PCR, and DNA sequencing) data analysis and interpretation. One lecture hour and two laboratory periods of three hours a week. *(Fall)*

BIOL 5171. Cell Physiology. (3) The fundamental physicochemical properties of cells. *(Fall)*

BIOL 5184. Plant Biotechnology. (3) A laboratory-oriented course designed to integrate plant molecular biology, recombinant DNA technology, and plant cell and tissue culture. One lecture hour and two laboratory periods of three hours a week. *(Spring) (Alternate years)*

BIOL 5189. Mechanisms in Development. (3) Cellular and molecular bases of differentiation; an exploration of the experimental analysis of causal and controlling factors in development. *(Spring)*

BIOL 5199. Molecular Biology. (3) Structural and functional interaction of nucleic acids and proteins in the replication, transcription and translation of genetic material. *(Fall)*

BIOL 5205. Advanced Horticulture. (3) Topics in ornamental horticulture and landscaping, including greenhouse projects and field trips. Two lecture hours and three hours of lab a week. *(Spring)*

BIOL 5221. Plant Systematics. (4) Identification and classification of vascular plants, including experimental concepts of speciation. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 5223. The Fungi. (3) Morphology, life cycles, ecology, taxonomy, and medical economic significance of the fungi and organisms historically aligned with the fungi. *(On demand)*

BIOL 5223L. The Fungi Laboratory. (1) Co-requisite/prerequisite: BIOL 5223; Consent of department for graduate credit. One laboratory period of three hours a week. *(On demand)*

BIOL 5229. Dendrology. (4) The identification, structure, function, ecology, reproduction, and evolutionary relationships of woody plants. Three lecture hours and one three-hour lab a week. *(Fall)*

BIOL 5233. Parasitology. (4) Morphology, life cycles, ecology, taxonomy and economic importance of parasites. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 5234. Wildlife Biology. (3) Concepts, principles and techniques of wildlife biology. Identification and life histories with emphasis on the value, study attraction, management, conservation and control of wildlife species. *(On demand)*

BIOL 5234L. Wildlife Biology Laboratory. (1) Prerequisite or corequisite: BIOL 5234. One laboratory period of three hours a week plus field trips. *(On demand)*

BIOL 5235. Mammalogy. (4) Taxonomy, anatomy, physiology and life histories of the mammals. Three lecture hours and one laboratory period of three hours a week. *(Fall)*

BIOL 5242. The Biology of Birds. (3) Prerequisite: BIOL 3144 or consent of department. Overview of general avian biology, including taxonomy and anatomy, but concentrating on behavior, ecology and conservation of birds. Focus will be on birds of the southeastern U.S. *(Spring)*

BIOL 5242L. The Biology of Birds Lab. (1) Meets for one three-hour period per week. The laboratory and field portion of the Biology of Birds will focus on field identification and inventory techniques, with an introduction to anatomy. Students will need binoculars. *(Spring)*

BIOL 5243. Animal Behavior. (3) An ethological approach to how animals respond to their environment. Causation, development and adaptive significance of behavior in social systems. *(Fall)*

BIOL 5243L. Animal Behavior Laboratory. (1) Prerequisite or corequisite: BIOL 5243. One laboratory period of three hours a week. *(Fall)*

BIOL 5244. Conservation Biology. (3) Conservation values, extinction rates, genetic diversity, demography, habitat fragmentation, reserve management, ecological restoration. *(Yearly)*

BIOL 5244L. Conservation Biology Laboratory. (1) Prerequisite or corequisite: BIOL 5244. One laboratory period of three hours a week plus field trips. *(Yearly)*

BIOL 5250. Microbiology. (3) Morphology, physiology, pathogenicity, metabolism and ecology of micro-organisms. *(Spring, Fall)*

BIOL 5250L. Microbiology Laboratory. (1) Prerequisite or corequisite: BIOL 5250. One laboratory period of three hours a week. *(Spring, Fall)*

BIOL 5251. Immunology. (3) Cellular, molecular and genetic basis for immunity; physical chemistry of antigens and antibodies and their interactions; defense mechanisms. *(Spring, Summer)*

BIOL 5251L. Immunology Laboratory. (1) Prerequisite or corequisite: BIOL 5251. One laboratory period of three hours a week. *(Spring)*

BIOL 5253. Marine Microbiology. (4) Bacteria, fungi and viruses of marine origin, and their response to the salt, temperature, pressure and nutrient environment of the ocean. Roles of marine microorganisms in public health, pollution and fouling. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 5254. Epidemiology. (3) History and practices of epidemiology with emphasis on modes of transmission of clinically important infectious agents and the analysis of epidemiological data. Three lecture hours a week. *(On demand)*

BIOL 5255. Bacterial Genetics. (3) Regulation of gene expression in bacterial systems. Bacteriophage genetics. DNA transfer in bacteria. *(Spring)*

BIOL 5256. Pathogenic Bacteriology. (3) Cellular and molecular interactions of mammalian hosts with procaryotic parasites. *(Fall)*

BIOL 5256L. Pathogenic Bacteriology Laboratory. (1) One laboratory period of three hours a week. *(Fall)*

BIOL 5257. Microbial Physiology and Metabolism. (3) Bacterial cell growth and division, transport mechanisms, catabolism and energy production, biosynthesis of cellular components, global regulation of gene expression in response to the environment, and cell-cell communication between bacteria. *(Spring)*

BIOL 5257L. Microbial Physiology and Metabolism Lab. (1). Laboratory experiments on such topics in general microbiology as the preparation and use of cell-free systems, isolation of auxotrophs, transport mechanisms, radiolabelling and separation of proteins, etc. *(Spring)*

BIOL 5259. Virology. (3) Morphology, classification, genetics and pathogenicity of bacterial and animal viruses. *(Fall)*

BIOL 5259L. Virology Laboratory. (1) Prerequisite or corequisite: BIOL 5259. One laboratory period of three hours per week. *(Fall)*

BIOL 5260. Population Genetics (3) The genetics of qualitative and quantitative traits in populations, including an assessment of the factors affecting the extent and pattern of the genetic variation in these traits. *(On demand)*

BIOL 5277. Endocrinology. (3) Endocrine glands and their physiological roles in metabolism, growth and reproduction. *(On demand)*

BIOL 5277L. Endocrinology Laboratory. (1) Prerequisite or corequisite: BIOL 5277. One laboratory period of three hours a week. *(On demand)*

BIOL 5279. Neurobiology. (3) Physiology and anatomy of nervous systems, especially mammalian. *(Spring)*

BIOL 5279L. Neurobiology Laboratory. (1) Prerequisite or corequisite: BIOL 5279. One laboratory period of three hours a week. *(Spring)*

BIOL 5282. Developmental Plant Anatomy. (3) Study of plant cells, tissues, organs and patterns of growth and differentiation. *(Spring)*

BIOL 5282L. Developmental Plant Anatomy Laboratory. (1) Prerequisite or corequisite: BIOL 5282. One laboratory period of three hours a week. *(Spring)*

BIOL 5283. Animal Development. (3) Developmental processes occurring chiefly during gametogenesis, fertilization, early embryogenesis and organogenesis. *(Fall)*

BIOL 5283L. Animal Development Laboratory. (1) Prerequisite or corequisite: BIOL 5283. One laboratory period of three hours a week. *(Fall)*

BIOL 5291. Histology. (4) Animal tissues and organs; techniques of preparing tissues for analysis. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 5292. Advances in Immunology. (3) Current topics in immunology with particular emphasis upon the genetic systems and molecular mechanisms underlying immune reactions. *(Fall)*

BIOL 5293. Comparative Vertebrate Anatomy. (4) Prerequisite: BIOL 2111. Comparative studies of the anatomy, physiology and functional adaptations of selected vertebrates with emphasis on evolutionary developments, especially in mammals. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 6000. Special Topics in Biology. (1-4) Prerequisite: consent of department. Courses in selected topics and advanced studies in biology. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6010. Special Topics in Microbiology. (1-4) Prerequisite: consent of department. Advanced courses in microbiology. May be repeated for credit as topics vary.

Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6020. Special Topics in Systematic Biology. (1-4) Prerequisite: consent of department. Advanced courses in systematic and evolutionary biology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6030. Special Topics in Genetics. (1-4) Prerequisite: consent of department. Advanced courses in genetics. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6040. Special Topics in Molecular Biology. (1-4) Prerequisite: consent of department. Advanced courses in biochemistry and molecular biology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6050. Special Topics in Physiology. (1-4) Prerequisite: consent of department. Advanced courses in physiology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6060. Special Topics in Developmental Biology. (1-4) Prerequisite: consent of department. Advanced courses in developmental biology and embryology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6070. Special Topics in Anatomy. (1-4) Prerequisite: consent of department. Advanced courses in anatomy and morphology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6080. Special Topics in Behavior. (1-4) Prerequisite: consent of department. Advanced courses in behavior. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6090. Special Topics in Ecology. (1-4) Prerequisite: consent of department. Advanced courses in ecology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 6102. Cell and Molecular Biology. (4) Prerequisites: CHEM 6101, or consent of instructor. Structure of cellular components; the cell cycle; regulation of transcription, translation, and protein trafficking; cell membranes and transport; cell-cell communication, including signal transduction; extracellular matrix. Thirty two-hour lectures. *(Fall)*

BIOL 6103. Microbiology and Immunology. (4) Prerequisites: CHEM 6101 and BIOL 6102, or consent of instructor. Function and pathogenesis of prokaryotes, as well as related aspects of host response. Microbial physiology with an emphasis on aspects relevant to pathogenesis; bacterial genetics with an emphasis on operons and regulons as model of control of bacterial gene expression; pathogenic microbiology with an emphasis on invasion and intracellular survival; immunology with an emphasis on the role of the immune response in resistance to infection. Thirty two-hour lectures. *(Spring)*

BIOL 6104. Integrative Systems Physiology. (4) Prerequisites: CHEM 6101, BIOL 6102, BIOL 6103, or consent of instructor. The functioning of an intact mammalian organism with an emphasis on human physiology. Traditional survey of organ systems' functions, and problems of the response of cells within tissues to stress and their impact on organismal response. Thirty two-hour lectures. *(Spring)*

BIOL 6600. Seminar. (1-2) Topics of current emphasis in biology. May be repeated for credit. *(Fall, Spring)*

BIOL 6800. Tutorial. (1-4) Directed study in areas of specialization in biology and related fields. Maximum credit toward degree: four hours. *Pass/No Credit* or *IP* grading only. *(Fall, Spring)*

BIOL 6900. Research and Thesis. (1-8) *Pass/No Credit* or *IP* grading only. *(Fall, Spring)*

BIOL 7999. Master's Degree Graduate Residence. (1)

BIOL 8000. Special Topics in Biology. (1-4) Prerequisite: consent of department. Courses in selected topics and advanced studies in biology. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 8010. Special Topics in Microbiology. (1-4) Prerequisite: consent of department. Advanced courses in microbiology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 8030. Special Topics in Genetics. (1-4) Prerequisite: consent of department. Advanced courses in genetics. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 8040. Special Topics in Molecular Biology. (1-4) Prerequisite: consent of department. Advanced courses in biochemistry and molecular biology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 8050. Special Topics in Physiology. (1-4) Prerequisite: consent of department. Advanced courses in physiology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. *(On demand)*

BIOL 8102. Cell and Molecular Biology. (4) Prerequisites: CHEM 8101, or consent of instructor. Structure of cellular components; the cell cycle; regulation of transcription, translation, and protein trafficking; cell membranes and transport; cell-cell communication, including signal transduction; extracellular matrix. Thirty two-hour lectures. (*Fall*)

BIOL 8103. Microbiology and Immunology. (4) Prerequisites: CHEM 8101 and BIOL 8102, or consent of instructor. Function and pathogenesis of prokaryotes, as well as related aspects of host response. Microbial physiology with an emphasis on aspects relevant to pathogenesis; bacterial genetics with an emphasis on operons and regulons as model of control of bacterial gene expression; pathogenic microbiology with an emphasis on invasion and intracellular survival; immunology with an emphasis on the role of the immune response in resistance to infection. Thirty two-hour lectures. (*Spring*)

BIOL 8104. Integrative Systems Physiology. (4) Prerequisites: CHEM 8101, BIOL 8102, BIOL 8103, or consent of instructor. The functioning of an intact mammalian organism with an emphasis on human physiology. Traditional survey of organ systems' functions, and problems of the response of cells within tissues to stress and their impact on organismal response. Thirty two-hour lectures. (*Spring*)

BIOL 8200. Interdisciplinary Colloquium. (1) Prerequisites: Admission to the Interdisciplinary Ph.D. in Biology Program. Discussion and analysis of topics of current emphasis in biomedicine and biotechnology. May be repeated for credit. Offered on a *Pass/No Credit* basis only. (*Fall*)

BIOL 8201. Seminar. (1) Prerequisites: Admission to the Interdisciplinary Ph.D. in Biology Program. Formal student presentations of current literature topics. May be repeated for credit. Offered on a *Pass/No Credit* basis only. (*Spring*)

BIOL 8800. Laboratory Rotations. (2) Prerequisites: Admission to the Interdisciplinary Ph.D. in Biology Program. Directed study in an area of specialization. May be repeated for credit. Offered on a *Pass/No Credit* basis only. (*Fall, Spring, Summer*)

BIOL 8999. Doctoral Dissertation Research. (0-9) Prerequisites: Admission to the Interdisciplinary Ph.D. in Biology Program. Individual investigation that culminates in the preparation and presentation of a doctoral dissertation. May be repeated for credit. Offered on a *Pass/No Credit* or *IP* basis only. (*Fall, Spring, Summer*)

BIOL 9999. Doctoral Degree Graduate Residence. (1)

CHEMISTRY

Department of Chemistry
Burson Building, Room 200
704-687-4765
http://www.chem.uncc.edu/grad/

Degrees
M.S. in Chemistry
Ph.D. Interdisciplinary degree in Biotechnology and BioMedicine
Ph.D. in Materials through Mechanical Engineering
Ph.D. in Optics and Optoelectronics

Coordinator
Dr. Brian T. Cooper
btcooper@email.uncc.edu

Graduate Faculty
Banita W. Brown, Associate Professor
Brian T. Cooper, Associate Professor
Bernadette T. Donovan-Merkert, Professor, Departmental Chair
Thomas D. DuBois, Charles H. Stone Professor of Chemistry
Mahnaz El-Kouedi, Assistant Professor
Kenneth E. Gonsalves, Celanese Acetate Distinguished Professor of Polymer Chemistry
Daniel S. Jones, Associate Professor
Joanna K. Krueger, Associate Professor
Craig A. Ogle, Professor
Jordan C. Poler, Associate Professor
Daniel Rabinovich, Associate Professor
John M. Risley, Professor
Thomas, A. Schmedake, Assistant Professor
Wade N. Sisk, Associate Professor

MASTER OF SCIENCE IN CHEMISTRY

The Chemistry Department offers a research-based Master of Science (M.S.) degree, which provides the background necessary for further graduate or professional studies in the physical, life or medical sciences or a career in chemistry. The M.S. degree requires a minimum of 30 credit hours and a thesis based on original research carried out under the direction of a member of the graduate faculty. Student participation in research activities is through selection of a faculty adviser and

enrollment in the special research courses offered. Major emphasis is placed upon the research project and required thesis. UNC Charlotte B.S. degree chemistry majors may elect to participate in the five year Accelerated Early Entry M.S. program (described in the undergraduate catalog).

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Chemistry:

1) A satisfactory score on the Graduate Record Examination.
2) Administration of placement examinations by the department each semester just prior to registration as an aid in identifying academic deficiencies.
3) Removal of any deficiencies within one year.
4) A score of 220 or better is required on the computer based TOEFL for international students.

Degree Requirements

The candidate for the degree must present a minimum of 30 semester hours including at least 15 semester hours in 6000-level courses open to graduate students only. Required courses may include CHEM 3141, 3142, 5111, 5121, 5133, 5134 5135 or 5165. Two semester hours of graduate seminar, CHEM 6681 and CHEM 6682, and at least one, but up to 16 semester hours of research and thesis credit, CHEM 6900, must be taken. In addition, six semester hours from the course group CHEM 6060, 6069, 6082, 6101, 6115, 6125, 6126, 6135, 6138, 6145, 6146, 6147, 6155, 6165, or MEGR 6109 or another course that has been approved by the Chemistry faculty, are required. Departmental approval is necessary before CHEM 6060 credit can be used to satisfy this requirement. Any 5000 level or higher Biology, Engineering, Mathematics or Physics course, except those designed for a professional education sequence, may be taken for graduate credit upon departmental approval. Well-prepared students, particularly those with degrees from ACS-approved programs, will normally satisfy the requirement for CHEM 3141, 3142, 5111, 5121, 5133, 5134, 5135 or 5165 through placement examinations administered after admission. In those cases, hours that would have been earned for these courses may be replaced by research, CHEM 6900, or by elective courses. A grade point average of 3.0 is required for the degree. An accumulation of two marginal (C) grades on the graduate transcript will result in termination of the student's enrollment in the M.S. Program and a termination of any assistantships and fellowships they were receiving.

A student in the chemistry M.S. program is required to maintain satisfactory progress toward the degree. Continued enrollment is at all times subject to review on the basis of academic record. This review is performed by the departmental Graduate Committee.

Admission to Candidacy

An Admission to Candidacy form must be submitted approximately one month prior to the beginning of the semester in which the graduate student expects to complete all requisites for the M.S. degree.

Assistantships

Graduate students generally support their education through teaching or research assistantships available through the Chemistry Department. The department also sponsors the Gary Howard Research Fellowship competition, which provides significantly greater support to one highly qualified applicant. Tuition waivers are also available to external applicants through the Thomas Walsh Tuition Fellowships. Many faculty may offer research assistantships to qualified students Further information is available in the Department. Support in the summer months is also available.

Electives

Any 5000 level or higher Biology, Engineering, Mathematics or Physics course, except those designed for a professional education sequence, may be taken for graduate credit upon departmental approval.

Advising

Approval of the program of each student and monitoring his/her progress toward the degree is the responsibility of the student's research adviser. Prior to the selection of a research adviser, graduate student progress is monitored by the departmental Graduate Committee.

Thesis

A thesis must be written and defended within six calendar years after admission into the M.S. program as a degree student.

Thesis Committee

The written thesis is defended before the department and a special thesis committee of no fewer than four persons, with at least one member from outside of the Chemistry Department.

Application for Degree

The Application for Degree can be submitted on the form supplied by the Graduate School no later than the filing date specified in the University calendar.

Research Experiences

Chemistry faculty offer research opportunities in all areas of molecular and nanoscale sciences, and many participate in formal or informal interdisciplinary research programs. Faculty research interests include computational chemistry, organic synthesis, polymer chemistry, organometallic chemistry, structural and mechanistic organic chemistry, electrochemistry, materials and interfacial chemistry, catalysis, biochemistry, biophysical chemistry, analytical separations, bioanalytical chemistry, mass spectrometry, and chemical education. Many

chemistry faculty are active participants in interdisciplinary research projects in biotechnology and biomedicine, optical science, materials science, or electrical engineering. Students receive academic credit for their research and benefit from a low student-to-faculty ratio. Graduate students are assigned individual projects and work closely with faculty members to build their own, original contribution to the scientific literature. Students have full access to and receive excellent training in the use of any departmental instrumentation needed to carry out their research. Results are presented at informal seminars, scientific conferences, and in articles published in high-quality, refereed journals. Research in the Department is funded in part from competitive grants obtained from agencies such as the American Chemical Society, National Science Foundation, National Institutes of Health, DoD, DoE, Research Corporation, Dreyfus Foundation, North Carolina Biotechnology Center, UNC Charlotte Foundation, and private industry.

Tuition Waivers

Fellowships are available for students enrolled in the Master's degree program in Chemistry and for students seeking an interdisciplinary Doctoral degree through the Chemistry Department. Further information is available in the Department.

Courses in Chemistry

CHEM 5090. Special Topics in Chemistry. (1-4) Prerequisite: consent of the instructor. Selected topics in chemistry. Lecture and/or laboratory hours will vary with the nature of the course taught. May be repeated for credit. *(On demand)*

CHEM 5095. Topics for Teachers. (1-4) Prerequisite: consent of the instructor. Selected topics in chemical education. Lecture and/or laboratory hours will vary with the nature of the course taught. May be repeated for credit. *(On demand)*

CHEM 5111. Instrumental Analysis. (3-4) Prerequisites: Consent of the instructor. Selected modern instrumental methods of analysis, including theory and practice, with considerable attention given to the instrument and elementary electronics involved in the techniques. Two lecture hours and six hours of lab per week. *(Spring)*

CHEM 5121. Advanced Inorganic Chemistry. (3-4) Prerequisites: Consent of the instructor. Theoretical inorganic chemistry including the application of physicochemical principles to the study of inorganic systems. Laboratory work involves inorganic preparations and characterization techniques. Three lecture hours and one laboratory period of three hours a week. *(Fall)*

CHEM 5133. Methods of Organic Structure Determination. (2) Prerequisites: Consent of the instructor. Study and application of modern techniques, primarily spectroscopy, to determine the structure of organic molecules. One hour of lecture and one laboratory period of three hours each week. *(Spring)*

CHEM 5134. Organic Reaction Mechanisms. (2) Prerequisites: Consent of the instructor. Mechanistic and theoretical topics which are beyond the scope of CHEM 2131/2132, including orbital symmetry control of organic reactions, the Hammett Equation and other linear free energy relationships, heterocyclic compounds, polycyclic aromatic compounds, organic photochemistry, carbines, nitrenes, arynes and other short lived, reactive intermediates. *(Spring) (Alternate years)*

CHEM 5135. Concepts and Techniques in Organic Synthesis. (2) Prerequisite or co-requisite: CHEM 5133, or consent of the instructor. Modern techniques of organic synthesis. Laboratory includes one or more multi-step syntheses of complex molecules. One hour of lecture and one laboratory period of three hours each week. *(Spring) (Alternate years)*

CHEM 5165. Principles of Biochemistry I. (3) Prerequisite: satisfactory score on an organic chemistry proficiency exam, or consent of the instructor. A study of the structures, properties, and functions of biological molecules, bioenergetics of biological reactions, and enzyme catalysis, with particular emphasis on the underlying chemical principles, including thermodynamics and kinetics. *(Fall)*

CHEM 5165L. Principles of Biochemistry I Laboratory. (1) Prerequisite or corequisite: CHEM 5165. Physical properties of biological molecules and an introduction to experimental techniques in biochemical research. Eleven four-hour lab periods. *(Fall)*

CHEM 5166. Principles of Biochemistry II. (3) Prerequisite: CHEM 5165 with a grade of B or better. A study of various metabolic pathways and information transfer including molecular aspects of cell biology and genetics, with particular emphasis on the underlying chemical reactions, including thermodynamics and kinetics. *(Spring)*

CHEM 5167. Structure and Mechanism in Protein Chemistry (3) Prerequisites: CHEM 5165, and either CHEM 5166 or BIOL 5171, or consent of the instructor. Examination of structures, properties, and functions of proteins, enzyme catalysis, and bioenergetics, emphasizing underlying mechanistic chemical and biochemical principles. *(Spring) (Alternate years)*

CHEM 5171. Biochemical Instrumentation. (4) Prerequisites: CHEM 5165 and 5165L with a grade of B or better or the consent of the department. Modern instrumental methods used in biorelated areas such as biochemistry, biotechnology and medical technology. Theory and practice. Potentiometry, spectrophotometry,

chromatography, sedimentation, and electrophoresis. Two lecture hours and two three-hour laboratory periods per week. *(Spring)*

CHEM 5175. Physical Biochemistry. (3) Prerequisites: CHEM 5165, 5165L, and 5166, with a grade of B or better, or consent of the instructor. Colloid systems, equilibria in biological fluids, mass and energy transport in fluids and in association with membranes, energy storage and dissipation with relation to specific chemical bonding, enzyme kinetics. *(On demand)*

CHEM 5185. Chemical Fate of Pollutants. (3) Prerequisites: satisfactory score on chemistry proficiency exam, or consent of the instructor. Chemical reactivity and fate of pollutants (in air, water, soil) in terms of their chemical structure and energetics, mechanisms, structure/energy relationships and their interaction with reactive environmental species including light. *(Spring) (Alternate years)*

CHEM 5200. Computational Chemistry. (4) Prerequisite or co-requisite: Consent of instructor. Electronic and molecular mechanics-based computational methods, including properties, optimized equilibrium and transition state structures and potential energy surfaces of reactions. Three lecture hours and three hours of laboratory each week. Additional projects required of graduate students. *(Fall, Spring)*

CHEM 6060. Special Topics and Investigations. (1-3) Prerequisite: consent of the instructor. Directed study of topics of current chemical interest. May be repeated for credit. *(On demand)*

CHEM 6069. Topics in Biochemistry. (3) Prerequisites: CHEM 6165, or consent of instructor. Discussion of current topics in biochemistry emphasizing their biomedical/biotechnological aspects from bioinorganic chemistry, bioorganic chemistry, bioanalytical chemistry, biophysical chemistry, biocomputational chemistry, biomaterials. May be repeated for credit. Three lecture hours per week. *(Spring)*

CHEM 6082. Surfaces and Interfaces of Materials Chemistry. (3) Prerequisites: Any three semesters of undergraduate calculus based mathematics (i.e., MATH 1241, 1242, and 2241) and an upper level undergraduate course in thermodynamics (i.e., CHEM 3142, PHYS 3151 OR MEGR 3112) or consent of the instructor. Theoretical basis, conceptual understanding and experimental investigations of the properties of surfaces and interfaces of various classes of materials will be presented. The content of this course will build from a rigorous derivation of the physical chemistry of surfaces and interfaces to a discussion of topical materials classes and specific materials properties. Three lecture hours each week. *(Alternate years)*

CHEM 6101. Biochemical principles. (3) Prerequisites: Consent of instructor. Molecular biophysics of biological molecules. Bioenergetics of biological reactions and enzyme structure, mechanisms, and regulation. Metabolic pathways and the role of cellular organelles. Biochemical analysis methodology. Twenty-three two-hour lectures. *(Fall)*

CHEM 6115. Advanced Analytical Chemistry. (3) Prerequisite: CHEM 5111 with a grade of B or better, or consent of the instructor. The application of modern analytical methods to chemical problems. Emphasis is upon the chemical information, particularly structural, obtainable from these techniques. *(On demand)*

CHEM 6125. Theoretical Inorganic Chemistry. (3) Prerequisite: CHEM 5121 with a grade of B or better, or consent of the instructor. Group theoretical treatment of current theories of inorganic chemistry. Topics covered: Ligand field theory, molecular orbital theory for complex ions, electronic spectra of complex ions and the magnetic properties of complex ions. *(On demand)*

CHEM 6126. Organometallic Chemistry. (3) Prerequisites: Consent of instructor. Previous or concurrent enrollment in CHEM 5133 recommended. Synthesis, structure, characterization, and reactivity of organometallic compounds; introduction to catalysis and bioorganometallic chemistry. Three lecture hours each week. *(On demand)*

CHEM 6135. Advanced Organic Chemistry. (3) Prerequisite: CHEM 5133 and either 5134 or 5135 with a grade of B or better, or consent of the instructor. A qualitative discussion of modern mechanistic interpretation of the relations between structure and reactivity. Special emphasis is placed on the role of reactive intermediates such as carbonium ions, carbanions, carbines and radicals. *(On demand)*

CHEM 6138. Stereochemistry. (3) Prerequisite: Advanced course in Biochemistry or Organic Chemistry. Three-dimensional chemistry and its chemical, physical and biochemical consequences, emphasizing classification of isomers and stereoisomers and the consequences of molecular shape on chemical and biological properties. *(Spring) (Alternate years)*

CHEM 6145. Chemical Thermodynamics. (3) Prerequisite: Consent of the instructor. The postulatory basis of classical thermodynamics. Problems in chemical thermodynamics. The use of statistical mechanics for calculating thermodynamic functions. *(On demand)*

CHEM 6146. Rates and Mechanisms. (3) Prerequisite: Consent of the instructor. Consideration of chemical kinetics and mechanism schemes, particularly those of current interest. *(On demand)*

CHEM 6147. Molecular Photochemistry & Photophysics. (3) Prerequisite: Admission to graduate program or consent of instructor. An investigation of the excited states of organic molecules and the photophysics governing radiative and nonradiative transitions. Topics include electronic orbitals, absorption, emission, potential energy surfaces, energy transfer, photophysical radiationless transitions, singlet oxygen and chemiluminescent organic reactions. Three lecture hours per week. (*Alternate years*)

CHEM 6150. Seminar-Internship. (1-3) Prerequisite: Consent of the instructor. Required for all teaching assistants. Supervised experience in the teaching of college chemistry. Graded Pass/No Credit. May be repeated for credit. *(Fall, Spring)*

CHEM 6155. Polymer Synthesis. (3) Prerequisite: Consent of the instructor. Polymer structure, classification of polymerization reactions, theory and practice of step growth polymerization, radical, ionic and ring opening polymerizations, polymerization by transition metal catalysts. Recent advances in polymer synthesis. Three lecture hours per week. (*On demand)*

CHEM 6165. Advanced Biochemistry. (3) Prerequisites: CHEM 6101, BIOL 6102, 6103, 6104, or consent of instructor. Advanced course on protein structure, enzyme and mechanistic biochemistry, metabolic biochemistry, biophysical chemistry. Three lecture hours per week. *(Spring)*

CHEM 6681. Research Seminar. (1) Prerequisite: consent of the instructor. Individual investigation and exposition of the results. *(Fall, Spring)*

CHEM 6682. Research Seminar. (1) Prerequisite: consent of the instructor. Individual investigation and exposition of the results. May be repeated for credit. *(Fall, Spring)*

CHEM 6900. Research and Thesis. (1-16) Prerequisite: consent of the instructor overseeing thesis research. Laboratory research for the thesis. *(Fall, Spring, Summer)*

CHEM 7999. Graduate Residence. (1) Prerequisite: consent of the instructor overseeing thesis research. Required of all master's degree students who are working on a thesis but not enrolled in other graduate courses. *(Fall, Spring)*

CHEM 8069. Topics in Biochemistry. (3) Prerequisites: CHEM 6165, or consent of instructor. Discussion of current topics in biochemistry emphasizing their biomedical/biotechnological aspects from bioinorganic chemistry, bioorganic chemistry, bioanalytical chemistry, biophysical chemistry, biocomputational chemistry, biomaterials. May be repeated for credit. Three lecture hours per week. *(Spring)*

CHEM 8101. Biochemical Principles. (3) Prerequisites: Admission to Ph.D. program or consent of instructor. Molecular biophysics of biological molecules. Bioenergetics of biological reactions and enzyme structure, mechanisms, and regulation. Metabolic pathways and the role of cellular organelles. Biochemical analysis methodology. Twenty-three two-hour lectures. *(Fall)*

CHEM 8147. Molecular Photochemistry & Photophysics. (3) Prerequisite: Admission to graduate program or consent of instructor. An investigation of the excited states of organic molecules and the photophysics governing the transitions between these states both radiative and nonradiative. Topics include electronic orbitals, absorption, emission, potential energy surfaces, energy transfer, photophysical radiationless transitions, singlet oxygen and chemiluminescent organic reactions. In this course each student will develop and demonstrate a photochemistry laboratory experiment that illustrates a principle or problem, or new direction of photochemistry. Three lecture hours per week. (*Alternate years*)

CHEM 8155. Polymer Synthesis. (3) Prerequisite: Admission to Ph.D. program or consent of instructor. Polymer structure, classification of polymerization reactions, theory and practice of step growth polymerization, radical, ionic and ring opening polymerizations, polymerization by transition metal catalysts. Recent advances in polymer synthesis. The course will require a "Research Proposal". This will include a presentation in class as well as a ten page prospectus style manuscript. Three lecture hours per week. (*On demand)*

CHEM 8165. Advanced Biochemistry. (3) Prerequisites: CHEM 8101, BIOL 8102, 8103, 8104. Advanced course on protein structure, enzyme and mechanistic biochemistry, metabolic biochemistry, biophysical chemistry. Three lecture hours per week. *(Spring)*

COGNITIVE SCIENCE

Department of Psychology
http://www.uncc.edu/cognisci/

Degree
Graduate Certificate

Coordinator:
Paula Goolkasian, Professor of Psychology

Graduate Faculty
Boyd Davis, Professor of English
Bei-Tseng (Bill) Chu, Professor of Software and Information Systems

Marvin Croy, Associate Professor of Philosophy
George Demakis, Assistant Professor of Psychology
Mark Faust, Assistant Professor of Psychology
Paul Foos, Professor of Psychology
Jane Gaultney, Associate Professor of Psychology
Paula Goolkasian, Professor of Psychology
Mirsad Hadzikadic, Dean, College of Information Technology
Larry F. Hodges, Chair and Professor of Computer Science
Tony Jackson, Associate Professor of English
Susan Johnson, Associate Professor of Psychology
Yogendra Kakad, Professor of Electical and Computer Engineering
Kayvan Najarian, Assistant Professor of Computer Science
Anita Raja, Assistant Professor of Software and Information Systems
Alan Rauch, Associate Professor of English
Ralf Thiede, Associate Professor of English
Lori Van Wallendael, Associate Professor of Psychology
David Wilson, Assistant Professor of Software and Information Systems
Jing Xiao, Professor of Computer Science

GRADUATE CERTIFICATE IN COGNITIVE SCIENCE

The Cognitive Science Certificate Program will offer graduate students an opportunity for an interdisciplinary program of study. Their training will focus on an understanding of human cognitive processes and the means by which complex mental processes can be modeled or simulated by artificial systems. Cognitive science is a dynamic and rapidly evolving field that studies intelligent systems by synthesizing the knowledge and methodology from the fields of cognitive psychology, artificial intelligence, linguistics, philosophy of mind and cognitive neuroscience. Students will be provided with the conceptual framework and the technical skills necessary to enhance careers in research, teaching, business or government. Students completing the program will add an interdisciplinary perspective to the training received in their major, better preparing them for employment or further study in a variety of sciences and social sciences. The certificate may be pursued concurrently with another graduate degree program at UNC Charlotte.

Additional Admission Requirements

The certificate program is open to all students who hold a bachelor's degree from an accredited university and either:

1) are enrolled and in good standing in a graduate degree program at UNC Charlotte, or
2) have a minimum GPA of 3.0 for their undergraduate courses.

Application for the Cognitive Science Certificate Program is made through the Office of Graduate Admissions.

Certificate Requirements

The Cognitive Science Certificate Program involves 15 hours of coursework. Students must take the required introductory course and at least two of the disciplinary courses. The remaining hours may come from any of the other topics courses listed. A cumulative GPA of 3.0 will be required and at most one course with a grade of C may be allowed toward the certificate.

Required

PSYC/ITCS/ITIS 6216 Introduction to Cognitive Science

Disciplinary courses (Must take at least two)

PSYC6116	Cognition
ENG5263	Linguistics and Language Learning
PHIL6050	Philosophy of Mind
ITCS6150	Intelligent Systems

Topics

ENG6070	Semiotics & Interpretation of Signs
PSYC6015	Topics in Perception & Physiological Psychology,
PSYC5316	Cognitive Neuroscience
PSYC6115	Sensation and Perception
PSYC6102	Research Design and Quantitative Methods
ITCS5151	Intelligent Robotics
ITCS5152	Computer Vision
ITCS6153	Neural Networks
ITCS6156	Machine Learning
ITCS6010	Topics: Virtual Reality
ITCS6170	Logic for AI
ITCS6158	Natural Language Processing
ECGR5196	Introduction to Robotics
ECGR6102	Optimization of Engineering Designs
ECGR6266/ECGR8266	Neural Networks Theory and Design
CEGR5181	Human Factors in Traffic Engineering
Topics, seminars, or other courses in the cognitive sciences approved by the Program Coordinator.	

Courses In Cognitive Science

CEGR 5181. Human Factors in Traffic Engineering. (3) Study of the driver's and pedestrian's relationship with the traffic system, including roadway, vehicle and environment. Consideration of the driving task, driver and pedestrian characteristics, performance and limitations with regard to traffic facility design and operation.

ECGR 5196. Introduction To Robotics. (3) Prerequisites: ECGR 2103 or MEGR 2101 and senior standing. Modeling of industrial robots including

homogeneous transformations, kinematics, velocities, static forces, dynamics, computer animation of dynamic models, motion trajectory planning, and introduction to vision, sensors and actuators (dual-listed with MEGR 4127). *(Fall)*

ECGR 6102. Optimization of Engineering Designs. (3) Prerequisite: ECGR 5101 or consent of department. The development of computationally feasible algorithms for solving optimization problems in engineering designs. Introduction to non-linear programming methods; study of constrained and unconstrained problems, linear programming problems and other related topics. *(On demand)*

ECGR 6266/ 8266. Neural Networks Theory and Design. (3) Topics include: Neural network model and network architectures; single layers, multiple layers network, perceptron learning rules; supervised hebian learning; performance optimization; widrow hoff learning; backpropagation; associative learning; competitive learning; grossberg network; Hopfield network; application of neural network. *(On demand)*

ENGL 5263. Linguistics and Language Learning. (3) Readings in, discussions of, and application of linguistically oriented theories of language acquisition, directed toward gaining an understanding of language-learning processes and stages. *(Yearly)*

ENGL 6070. Topics in English. (3) Selected topics of literature and language. May be repeated for credit as topics vary and with English Department approval. *(Fall, Spring)*

ITCS 5151. Intelligent Robotics. (3) Prerequisites: ITCS 1215 and MATH 2164, or consent of the Department. General introduction to spatial descriptions and transformations, and manipulator position and motion. More study on robot planning, programming, sensing, vision, and CAD/CAM. *(Odd, spring) (Evenings)*

ITCS 5152. Computer Vision. (3) Prerequisites: ITCS 1215 or MATH 2164, or consent of the Department. General introduction to Computer Vision and its application. Topics include low level vision, 2D and 3D segmentation, 2D description, 2D recognition, 3D description and model-based recognition, and interpretation. *(Odd, Spring) (Evenings)*

ITCS 6153. Neural Networks. (3) Prerequisites: ITCS 6114. Topics include: Basic notions and models of artificial neural nets; single layer neural classifiers; multilayer one-way neural nets; single layer feedback networks; neural models of associative memory; self organizing neural nets; translation between neural networks and knowledge bases; applications of neural networks. *(Even, Fall) (Evenings)*

ITCS 6156. Machine Learning. (3) Prerequisite: ITCS 6150 or consent of the department. Machine learning methods and techniques including: acquisition of declarative knowledge; organization of knowledge into new, more effective representations; development of new skills through instruction and practice; and discovery of new facts and theories through observation and experimentation. *(On demand)*

ITCS 6010. Topics in Computer Science. (3) Prerequisite: consent of the department. Topics in computer science selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 6170. Logic for Artificial Intelligence. (3) Prerequisite: ITCS 6150 or consent of the department. Introduction to basic concepts of logic for artificial intelligence, including declarative knowledge, inference, resolution, non-monotonic reasoning, induction, reasoning with uncertain beliefs, distributed information systems, intelligent information systems, planning and intelligent-agent architecture. *(On demand)*

ITCS 6150. Intelligent Systems. (3) Prerequisites: full graduate standing or consent of the department. To introduce core ideas in AI. Heuristic versus algorithmic methods; problem solving; game playing and decision making; automatic theorem proving; pattern recognition; adaptive learning; projects to illustrate theoretical concepts. *(Fall) (Evenings)*

ITCS 6158. Natural Language Processing. (3) Prerequisite: ITCS 6150. Principles, methodologies, and programming methods of natural language processing including foundations of natural language understanding, namely: lexical, syntactic, and semantic analysis, discourse integration, and pragmatic and morphological analysis. *(On demand)*

PHIL 6050 - Philosophy of Mind . (3) This course addresses questions concerning the relationship between body and mind, the existence of other minds, the nature of consciousness, and the architecture of cognition. Approaches to these questions include traditional philosophical sources (emphasizing metaphysics and epistemology) and more recent developments in cognitive science (including the computational model of mind, mental representation,connectionist systems, and artificial intelligence). Also addressed are ethical and social issues involved in the design and implementation of intelligent systems. *(Yearly)*

PSYC 5316. Cognitive Neuroscience. (3) Prerequisite: graduate standing or permission of the instructor. Biological basis of consciousness and the neurobiology of mental processes by which we perceive, act, learn, and remember; representation of mental processes from electrophysiological and brain imaging techniques, clinical neurology, and computational science. *(Alternate Years)*

PSYC 6015. Topics in Perception and Physiological Psychology. (3) An examination of selected topics in the areas of sensation and perception, physiological and neuropsychology, with an emphasis on the applications to the areas of clinical, community, and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6102. Research Design and Quantitative Methods in Psychology. (3) Prerequisites: MATH 1222 and PSYC 2102 or equivalent. Experimental and correlational methods of psychological research, including single subject designs with emphasis on research design and the application of statistical methods to psychological research. *(Fall)*

PSYC 6115. Sensation and Perception. (3) Processes involved in receiving and interpreting sensory data including all the sensory systems with an emphasis on vision. *(On Demand)*

PSYC 6116. Cognition. (3) Concerned with how humans acquire information, retain information in memory, and use this information to reason and solve problems. Current emphases include memory, category learning, planning, concept formation, problem solving, mental models, and knowledge representation. *(Alternate Years)*

PSYC 6216/ITCS 6216/ITIS 6216. Introduction to Cognitive Science. (3) This course presents multiple perspectives on the study of intelligent systems. Broad coverage of such topics as philosophy of mind; human memory processes; reasoning and problem solving; artificial intelligence; language processing (human and machine); neural structures and processes; and vision. Also included is participation in the cognitive science seminar (Same as ITCS 6216, and ITIS 6216) *(Fall Semester)*

COMMUNICATION STUDIES

Department of Communication Studies
5000 Colvard North
704-687-4005
www.uncc.edu/gradmiss/comsma.htm

Degree
M.A., Certificate

Coordinator
Dr. Barbara DeSanto, APR, Fellow PRSA

Graduate Faculty
Jonathan Crane, Associate Professor
Cristine Davis, Assistant Professor
Barbara DeSanto, Associate Professor
Robert John DeSanto, Adjunct Professor
Kirk Duthler, Assistant Professor
Alan Freitag, Associate Professor
Heather Gallardo, Assistant Professor
Dan Grano, Assistant Professor
Bill Hill, Professor
Richard Leeman, Professor
Shawn Long, Assistant Professor
Clifton Scott, Assistant Professor

MASTER OF ARTS IN COMMUNICATION

The Master of Arts in Communication Studies is designed to provide advanced study in the communication discipline, particularly in the areas of organizational communication, critical media and rhetorical studies, health communication, and public relations. All studies emphasize the ability to understand and analyze communication practices in different environments in the 21st Century. The curriculum is broad-based and is a balance of theory and application to practice.

Additional Admission Requirements
Students must meet all of the Graduate School requirements, including earning an acceptable score on the Graduate Record Examination and submit three letters of recommendation and a strong personal essay outlining their reasons for pursuing a master's degree.

Degree Requirements
The Master of Arts degree program requires the completion of thirty (30) credit hours of graduate work. All students, regardless of orientation and area of study, must complete two core courses: COMM 6101 Communication Theory and COMM 6100 Communication Research Methods within the first three semesters of work in the program. All students then complete twelve (12) hours of elective course work in Communication Studies, six (6) credit hours of approved study in a cognate area. Students writing a thesis or doing a directed project earn their final six (6) credit hours with these research-based activities. Students electing to sit for the comprehensive examination instead of writing a thesis or conducting a directed project finish up their final six (6) hours with two more elective classes, as the comprehensive examination carries no credit with it. No more than six (6) credit hours may be taken at 5000 level. Successful completion of the degree requires a minimum GPA of 3.0.

Post-Baccalaureate Study
The Department does allow students to take up to six (6) credit hours as a baccalaureate student; students must

follow the Graduate School guidelines for application for this status. Students are encouraged to meet with the Graduate Coordinator as soon as possible after registering as a post-baccalaureate student to discuss application procedures and program options.

Admission to Candidacy Requirements

The official candidacy form must be filed by the following deadlines before graduation materials can be processed by the Graduate School. Students are responsible for securing the proper forms and meeting the filing deadlines set by the Graduate School for each semester. The candidacy form is available from the Graduate School and must be filed with the Graduate School.

Assistantships

The Department has four regular research/teaching assistantships available on a competitive basis to qualified students. Students must complete an assistantship application (available from the Graduate Coordinator) and return it to the Department for consideration as a graduate assistant. This form is available to students upon formal acceptance into the program. Out-of-state students from the sixteen (16) Southeastern U.S. states region opting for the International Public Relations concentration are also eligible to apply for Academic Common Market (ACM) program, which provides financial assistance in various forms, including in-state tuition consideration and assistantships, based on availability of funds.

Core Courses

COMM 6100 Communication Research Methods
COMM 6101 Contemporary Viewpoints in Communication Theory

Area Descriptions

Organizational Communication
Organizational communication focuses on the various ways individuals influence and are influenced by organizations and their members. Work in organizational communication is concerned with organizational culture and symbolism, interpersonal and group communication, change communication, globalization, mediated communication, leader communication, structural concerns of organizational communication, and critical analysis of organizational communication.

Media/Rhetorical Critical Studies
Graduate study of the mass media at UNC Charlotte concentrates on applied and critical research on the organization and effects of media industries and new media technologies. Areas of study include persuasion and popular culture, computer-mediated persuasion, computer-mediated communication, and the rhetoric of spectator sport.

Health Communication
Health communication is a field of study offering students a better understanding of the communication within a health context. This includes, but is not limited to, provider-patient interaction, the creation, promotion, and influence of health information, social and community health issues, organizational issues, media issues, and interpersonal health communication.

Public Relations
The focus of public relations is on building and maintaining internal and external relationships with entities essential to an organization's success, including entities such as media, activist groups, community groups, and regulators. The focus of UNC Charlotte's program is on public relations management, especially in the areas of issues tracking, corporate communication, crisis communication, not-for-profit communication, and international public relations efforts. One strand of the public relations track includes the opportunity to study public relations at a partner university outside the U.S. for a semester through the Academic Common Market program.

Advising

Upon formal acceptance, all graduate students must meet with the Graduate Coordinator to file a proposed plan of study in the department and become familiar with the department's expectations. As students progress through their program of study, the Graduate Coordinator will assist them in selecting a suitable advisor and committee members for the thesis or directed project options.

Capstone Experiences

Students choose among three (3) options for their capstone experience: writing a thesis (6 credit hours); designing and conducting a directed project (6 credit hours); or taking the comprehensive examination (0credit hours).

Thesis
A thesis is a written research document incorporating original research in a student's area of interest. Students select a thesis committee chair and two committee members and submit a proposal to them. The written thesis is defended before the thesis chair and committee members in the semester the student graduates. A thesis must be written and defended within six (6) calendar years after admission into the Communication Studies master's program.

Directed Project
A directed project is an applied research document involving research and application to a real world problem or opportunity. Students select a directed project chair and two committee members and submit a project to them. The completed project is presented to the directed project chair and committee members in the semester the student graduates. A directed project must be successfully completed and presented within six (6)

calendar years after admission into the Communication Studies master's program.

Comprehensive Examination
The comprehensive examination is a four-hour written examination covering communication theory, communication research methods, and a third comprehensive area in communication. Students opting to take the comprehensive examination should indicate their intention to the Graduate Coordinator in the semester previous to the one in which they plan to sit for the examination. The examination itself carries no credit hours; students selecting this option must take six (6) additional credit hours to reach the thirty (30) hour credit requirement. These six credits may be taken in Communication Studies or a related department with the Graduate Coordinator's approval. The comprehensive examination must be successfully completed within the six (6) year master's time limit for degree completion.

Application for Degree
All degree application forms and deadlines are available from the Graduate School.

GRADUATE CERTIFICATE IN COMMUNICATION

The Graduate Certificate in Communication is designed to provide advanced study in the field of communication. The program emphasizes the ability to understand and analyze communication practices in the 21st century. The curriculum is broad based, and includes opportunities to study the theory and practice of communication in the areas of organizational communication, public relations, mass media, and health communication.

Additional Admission Requirements
GRE, personal statement, three letters of recommendation.

Certificate Requirements
Fifteen (15) credit hours in graduate communication courses, including COMM 6100 Communication Research Methods and COMM 6101 Contemporary Viewpoints in Communication Theory, with no more than six (6) credit hours at the 5000 level are required.

Core Courses
COMM 6100 Communication Research Methods
COMM 6101 Contemporary Viewpoints in Communication Theory

Advising
All incoming students are advised by the Graduate Coordinator. Students are free to designate another graduate faculty member of the Department of Communication Studies as their advisor of record.

COURSES IN COMMUNICATION

COMM 5000. Topics in Communication Studies. (3) Timely and important areas relevant to communication studies. May be repeated for credit with permission of the graduate advisor. *(On demand)*

COMM 5101. Media and the Law. (3) Survey of legal rights, restrictions, and ethical considerations in field of communication including the First Amendment, libel, invasion of privacy, obscenity law, regulation of electronic media, relationships between media and judiciary. *(Fall, Spring)*

COMM 5102. Federal Interpretation of the First Amendment. (3) In-depth case analysis of tests determining Constitutional boundaries of expression including clear and present danger, prior restraints, fighting words/symbolic speech, strict scrutiny, obscenity, indecency. *(On demand)*

COMM 5141. Advanced Organizational Communication. (3) Critical examination of the communication practices of organizations which accomplish such tasks as establishing organizational identification, influencing organizational members, and making decisions. Includes application of research methods to assess and analyze an organization's communication practices. *(Fall, Spring)*

COMM 5147. London Seminar in International Public Relations (3/3).
Course examines the complexities of public relations practice in an international setting. The seminar is taught by UNC Charlotte faculty at Regent's College in London for four weeks each summer, from mid-May through mid-June. The agenda begins with an overview of the factors that complicate communication across cultures and borders, then examines how those factors affect public relations practice in specific global regions. Principles acquired during this course will aid in improving international and cross-cultural public relations practice, and contribute to success in any profession. The seminar includes participation as guest speakers by London-based practitioners as well as visits to UK organizations relevant to international PR practice. *(Annually)*

COMM 6000. Topics in Communication Studies. (3) Intensive investigation of a timely and important topic in communication studies. The topic of investigation may vary from semester to semester. May be repeated for credit with permission of graduate advisor. *(On demand, Evenings)*

COMM 6100. Communication Research Methods. (3) Methods for systematic investigation of communication behavior. Theoretical and practical applications of both qualitative and quantitative research

methodologies are utilized for completion of original projects. *(Spring, Evenings)*

COMM 6101. Contemporary Viewpoints in Communication Theory. (3) A survey of the leading theoretical traditions in communication studies. Covers both qualitative and quantitative approaches to conceptualizing communication practices. *(Fall, Evenings)*

COMM 6110. Advanced Persuasion. (3) Analysis of theories of persuasion as a mode of social influence. Focus on the understanding and analysis of how persuasion works in various communicative contexts including mass-mediated, public relations, organizations and public advocacy. *(On demand, Evenings)*

COMM 6120. Communication and Network Society. (3) Examines the social dynamics arising from the global embrace of revolutionary communication technologies. Topics include the forces that shape new information flows and the effects emergent technologies exert across nations, local communities and individuals. *(On demand, Evenings)*

COMM 6121. Communication and the Internet. (3) This course considers the Internet as a social, cultural and political phenomenon. It will study and debate the competing visions of how the Internet does, can and should play a role in reshaping society. It will explore how the computer and network technologies shape communities as well as individual identities. The course will also address questions of law and public policy connected to issues of access, intellectual property and censorship. *(On demand, Evenings)*

COMM 6130. Textual Analysis. (3) The application of qualitative methods of language and rhetorical analysis to communication artifacts. The course uses a seminar approach to learn close textual analysis. Methodologies include dramatism, situational analysis, genre, metaphor, perspectival and postmodern paradigms. *(On demand, Evenings)*

COMM 6141. Organizational Communication Case Studies. (3) Communication theories are applied to real and fictional organizational cases. Topics such as culture, diversity, change, networks, and diffusion of innovations are examined from a communication perspective. *(Yearly, Evenings)*

COMM 6142. Seminar in Organizational Communication. (3) Using a seminar approach, this course surveys the theoretical approaches to the study of organizational behavior from a communication perspective. The course particularly focuses on issues of communication, roles and leadership. *(On demand, Evenings)*

COMM 6143. Organizations and Communication Technology. (3) This course studies the theories and concepts of how communication and technologies interact to shape organizational structures and communication processes. *(On demand, Evenings)*

COMM 6145. Communication Campaign Management. (3) A blending of theory and application to public relations/communication campaigns. The application dimension stresses mastery of the technical aspects of the campaign: research, problem-solving, planning, evaluation, and teamwork. The theoretical dimension stresses the study of actual campaigns and formulating generalizations regarding their successes or shortcomings. Class members serve on account teams with the instructor as manager. Account teams represent real-world clients and prepare a campaign book for the client's later implementation. *(Yearly, Evenings)*

COMM 6146. Media Relations. (3) This course will draw on academic and professional research to study the communication strategies and tactics associated with establishing and maintaining effective relations between public relations practitioners and the media. *(Yearly, Evenings)*

COMM 6170. Communication Law and Policy. (3) Survey of legal rights, legal restrictions, and policy developments governing public communication in the United States. *(On demand) (Evenings)*

COMM 6995. Directed Project in Communication. (3 or 6) May be repeated by permission of the Graduate Coordinator, if taken for three hours credit. Six hours of Directed Project may be taken during a single semester. Design, implementation, presentation and evaluation of an approved applied research project in student's specialty area. The Directed Project is of the student's own design under the supervision of a research advisory committee. *(On demand)*

COMM 6999. M.A. Thesis. (3 or 6) May be repeated by permission of the Graduate Coordinator, if taken for three hours credit. Six hours of Thesis may be taken during a single semester. Appropriate research and written exposition of that research is required. The Thesis is proposed and defended under the supervision of a research advisory committee. *(On demand)*

COMM 7999. Master's Degree Thesis Residence. (1) Required for continuing registration and enrollment while completing the Thesis or Directed Project. May be repeated with permission of the Graduate Coordinator. *(On demand)*

CRIMINAL JUSTICE

Department of Criminal Justice
226 Garinger Building
704-687-2563

Degree
M.S.

Coordinator
Dr. Michael G. Turner

Graduate Faculty
Bruce Arrigo, Professor
Beth Bjerregaard, Associate Professor
Anita Blowers, Associate Professor
Charisse Coston, Associate Professor
Charles Dean, Professor Emeritus
M. Lyn Exum, Assistant Professor
Paul C. Friday, Professor
Jennifer Hartman, Assistant Professor
David Hirschel, Professor Emeritus
Joseph B. Kuhns III, Assistant Professor
Vivian Lord, Associate Professor
Kathleen Nicolaides, Senior Lecturer
Michael G. Turner, Assistant Professor

MASTER OF SCIENCE IN CRIMINAL JUSTICE

The Master of Science degree program in Criminal Justice is designed to promote broad based study of the phenomenon of crime and to enhance career opportunities in the field of criminal justice. The program utilizes the social and behavioral sciences in an interdisciplinary approach to study law, crime, and social deviance, and to examine critically the systems created in response to deviance and crime. The objectives of the program are to: (1) provide present and future criminal justice personnel with the educational background necessary to function effectively in the dynamic field of criminal justice; (2) familiarize students with the nature, methods, and functions of research, and with the existing body of knowledge on criminal justice; (3) provide the criminal justice system with qualified candidates for careers in the field; and (4) prepare students for entrance into doctoral programs. Career opportunities available in the criminal justice system include law enforcement, corrections, administration, planning and analysis, juvenile justice, and college instruction. There are also private sector careers available, including private security. Students may enroll in the program on either a full-time or part-time basis. Many classes are scheduled in the evening to accommodate the part-time student.

Additional Admission Requirements
Admission to the Criminal Justice graduate program is open to students with bachelor's degrees in any discipline who meet the general requirements for admission to the Graduate School, provided they meet the following requirements. Applicants must have a grade point average of at least 2.75, a satisfactory score on the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT) , a personal statement, and strong recommendation letters from those who are able to attest to your academic ability.

Degree Requirements
A minimum of 36 semester hours is required. Eighteen of these 36 hours must be in courses open only to graduate students (6000 level and above). All students must complete each of the following five core courses with a grade of *B* or above: CJUS 6100 (Criminal Justice Policy); CJUS 6101 (The Nature and Theory of Crime); CJUS 6102 (Research in Criminal Justice I); CJUS 6103 (Research in Criminal Justice II); and CJUS 6104 (Criminal Justice and Social Control). A maximum of 12 hours may be taken outside the Criminal Justice Department, and a maximum of six hours with grades of *B* or above may be transferred from another institution. Transfer courses must be consistent with the program and will be accepted at the discretion of the department. At least 30 semester hours must be taken in residence. In addition to the above course work, all students are expected to successfully pass a qualifying exam. This exam is to be taken after the student has completed 12 credit hours including 6101 & 6102. Students can not proceed to the thesis or the applied research project until after they have passes the qualifying examination. Additionally, students must complete either a thesis (6 hours) or an applied research project (3 hours).

Assistantships
The Criminal Justice Department offers graduate assistantships which are awarded solely on the basis of academic merit.

Financial Aid
In addition to the graduate assistantships, the department offers, as available, research assistantships and grant-funded opportunities for students. In addition, the competitive Dean Reep Scholarship is available for an incoming graduate student each year.

Qualifying Examination
The qualifying examination is offered each Fall and Spring semester. Anyone who has successfully completed 12 semester hours, including 6101 & 6102 with a *B* or above, is eligible to take the examination. The qualifying examination may be taken no more than two times.

Courses in Criminal Justice

CJUS 5000. Topics in Criminal Justice. (3) Specialized criminal justice topics. May be repeated for credit. *(Fall, Spring)*

CJUS 5101. Drugs, Crime and the Criminal Justice System. (3) Provides an overview of the current state of drug use in this country and throughout the world and examines the nature and extent of drug use, the history of drug use/ abuse, contemporary drug use patterns, licit and illicit drug dealing and trafficking, crime and violence associated with drug use and drug markets, drug control strategies at the local, state, national and international level, treatment level, treatment options and alternatives, drug policy issues, legalization debates, and prevention strategies. *(On demand)*

CJUS 5103. International Criminal Justice. (3) Examination of the patterns and trends in international crime such as terrorism, transnational organized crime, and trafficking in people and a review of how the legal traditions of common law, civil law, Islamic law and socialist legal systems are structured and function criminal justice systems of the United States and other nations. *(On demand)*

CJUS 5160. Victims and the Criminal Justice System. (3) Relationship between victims of crime and the criminal justice system. Specific topics include an analysis of the characteristics of crime victims, victim reporting patterns, treatment of victims by the various segments of the criminal justice system, victim assistance programs, and the issue of compensation and/or restitution for victims of crime. *(On demand)*

CJUS 5161. Violence and the Violent Offender. (3) Issues surrounding violence in today's society and their impact on offenders involved in homicide, child and domestic abuse, and other forms of violence. Examination of myths about violence, victim-offender characteristics and relationships, and theories of violence. *(On demand)*

CJUS 5162. Sexual Assault. (3) Comprehensive and critical examination of sexual exploitation in the United States. *(On demand)*

CJUS 6000. Topics in Criminal Justice. (3-6) Specialized criminal justice topics. May be repeated for credit. *(On demand)*

CJUS 6100. Criminal Justice Policy. (3) Examination of the criminal justice subsystems (law enforcement, courts, corrections) with particular focus on the development of policy and the effectiveness of current policies aimed at reducing crime. *(Fall)*

CJUS 6101. The Nature and Theory of Crime. (3) Definitions and patterns of criminal behavior. Major theoretical perspectives on crime, including historical, philosophical, individual, community-oriented and societal approaches. *(Fall)*

CJUS 6102. Research in Criminal Justice I. (3) Introduction to research methodology and statistics with emphasis on applications to criminal justice settings. Topics to be covered include problem selection, theory, hypothesis formulation, research design, sampling, measurement and proposal writing. *(Spring)*

CJUS 6103. Research in Criminal Justice II. (3) Prerequisite: CJUS 6102. Advanced research methodology with emphasis on conducting, presenting and evaluating research in criminal justice settings. Topics to be covered include data collection, data input, data analysis, and interpretation. *(Fall)*

CJUS 6104. Criminal Justice and Social Control. (3) Examines how the law functions as a powerful tool of social control in our society. Particular emphasis is given to understanding the constitutional limitations placed on the construction of law, the elements of criminal offenses, and criminal defenses. *(Spring)*

CJUS 6120. Criminal Justice Management and Decision-Making. (3) Application of generic principles of management and supervision to operational problems confronted by criminal justice agencies with particular attention to decision- making and discretion in criminal justice settings. (*On demand*)

CJUS 6130. Law Enforcement Systems. (3) Consideration of the elements of law enforcement agencies as subsystems of the total criminal justice system. Comparisons of law enforcement systems in other countries is also considered. (*On demand*)

CJUS 6131. Police Problems and Practices. (3) Research on current issues in law enforcement with emphasis on the legal, social, and institutional contexts in which they occur. *(On demand)*

CJUS 6132. Legal Issues in Law Enforcement. (3) Law applicable to the functions of police administrators and line police officers including constitutional, statutory, judicial, and administrative law governing search and seizure, arrest, interrogation, use of force, jurisdiction, civil and criminal liability of administrators and officers, and the rights of officers and suspects. (*On demand*)

CJUS 6140. Prosecution and Adjudication Processes. (3) Functions and powers of prosecutors, defense attorneys, judges and juries including plea bargaining and court procedure. (*On demand*)

CJUS 6150. Corrections. (3) Functions of correctional agencies, principles of punishment and a historical analysis of correctional institutions and programs

including prisons, jails, probation and parole systems. *(On demand)*

CJUS 6151. Correctional Strategies: Rehabilitation and Reintegration. (3) Efforts to change offender behavior and to facilitate the development of offender-community linkages. Institutional classification and treatment strategies, pre-release and temporary release programs, innovative uses of probation and parole systems, community residential programs and new dispositional models; e.g., sentencing to community service and restitution. *(On demand)*

CJUS 6152. Legal Issues in Corrections. (3) Major legal issues pertaining to corrections, including sentencing, probation, restitution, prisons, parole, pardon and restoration of rights with emphasis on legal issues often confronted by correctional administrators and probation and parole personnel. *(On demand)*

CJUS 6160. Juvenile Justice Systems. (3) The process by which specific behaviors are identified as delinquent and the responses of the juvenile justice system to such behaviors. Laws dealing with the juvenile justice system, the historical development of the system, and the effectiveness of innovative responses to delinquency. *(On demand)*

CJUS 6170. Program Planning and Evaluation in Criminal Justice. (3) Applied research as a foundation for criminal justice planning and evaluation. Emphasis on the interrelationship of planning and evaluation within program management. *(On demand)*

CJUS 6800. Directed Individual Study in Criminal Justice. (1-6) supervised investigation of a criminal justice problem of special interest to the student. May be repeated one time with the approval of the student's major professor or academic committee. *(Fall, Spring, Summer)*

CJUS 6901. Thesis I. (3) Students taking this course will work on developing a research proposal of a significant criminal justice topic approved by the student's thesis committee. The final proposal will include an extensive literature review and a detailed discussion of the research plan. Graded credit/no credit. *(Fall, Spring, Summer)*

CJUS 6902. Thesis II. (3) Prerequisite: CJUS 6901. Students taking this course will conduct independent research developed in CJUS 6901, successfully defend the research in an oral defense meeting, and have the final written thesis approved by the graduate school. Graded credit/no credit. *(Fall, Spring, Summer)*

CJUS 6903. The Applied Research Project. (3) Prerequisite: must pass the qualifying examination, have a research project and Human Subjects Approval, where necessary. Students will develop a major paper on a topic of criminal justice importance. It is designed to be completed within one semester. This project is typically designed for research in agencies within the community and must be successfully defended in an oral defense meeting. It is geared towards the terminal Masters student and not appropriate for those seeking the doctorate. Graded credit/no credit. *(Fall, Spring, Summer)*

CJUS 7999. Graduate Residence (1) Continuation of work for the thesis or comprehensive exam. *(Fall, Spring, Summer)*

EARTH SCIENCES

Department of Geography and Earth Sciences

448 McEniry Building
704-687-2295
http://wwwgeoearth.uncc.edu

Degrees

M.S. Earth Sciences
Ph.D. Infrastructure and Environmental Systems (With the College of Engineering)

Coordinator

Dr. John F. Bender

Graduate Faculty

Craig Allan, Associate Professor
John Bender, Professor
Andy Bobyarchick, Associate Professor
M. C. Eppes, Assistant Professor
Brian Etherton, Assistant Professor
John Diemer, Associate Professor
Scott Hippensteel, Assistant Professor
Walter Martin, Associate Professor
Mark Thomasson, Assistant Professor

MASTER OF SCIENCE IN EARTH SCIENCES

The Department of Geography and Earth Sciences offers a Master of Science in Earth Sciences degree with opportunities for study and research in the areas of geology, hydrology, atmospheric science and environmental science. We also offer, in conjunction with the College of Engineering, a Ph.D. in Infrastructure and Environmental Systems (INES). Please see the Inter-College Graduate Programs section of this *Catalog* for a complete description of the requirements for the INES Ph.D.

Our combined Geography and Earth Sciences Department offers Earth Sciences graduate students personal guidance typical of a relatively small department,

with the field, laboratory, GIS and cartographic facilities and resources that accompany a much larger Earth Sciences department. Within this context, you will find a healthy combination of both field- and model-based Earth Sciences research as well as applied and academic research opportunities.

Our Earth Sciences faculty offer classes and are active in specific research areas that include surface and groundwater hydrology, vadose zone processes, geochemistry, marine geology and volcanology, biogeochemistry, mineralogy, structural geology, remote sensing, soil science, Quaternary geology, surficial processes, fluvial processes and depositional environments, clastic and carbonate sedimentology, basin analysis, stratigraphy, coastal geology, paleoecology, macro- and micropaleontology, environmental geology, hydrology and sedimentology, applied climatology, and numerical weather prediction and tropical meteorology.

The program is designed to address a range of student needs and to be completed in two years of full-time study. Graduates of the program will employ their expertise in a wide variety of activities and will be prepared for careers such as environmental consultants, geologists in the energy and mining industries, regulators in governmental agencies, students in doctoral programs, and earth science teachers in secondary schools. The M.S. in Earth Sciences prepares students for admission to traditional Geology and Earth Science Ph.D. programs as well as interdisciplinary Ph.D. programs such as Infrastructure and Environmental Systems.

Please refer to the Department of Geography and Earth Sciences Graduate Handbook for more details on deadlines and procedures.

Additional Admission Requirements

It is the policy of the Department to provide equal opportunities to all students regardless of race, creed, color, sex, or national origin. The Department requires applicants to demonstrate evidence of suitability for the program.

All applications for admission are reviewed by the Earth Sciences Graduate Committee. The Department admits applicants on a competitive basis as space in the program allows.

1) Grade Point Average (GPA): The Department expects an overall GPA of at least 2.75 (3.0 for junior and senior years). However, exceptions may be made if the other elements of the application are strong.
2) Letters of Recommendation: Three letters of reference are required. Letters from college or university teachers who have worked with and/or taught applicants are preferred. These letters are evaluated on the basis of how well the applicant is suited in terms of intellect, preparation and motivation to perform graduate work.
3) Personal Essays: Applicants must write a personal essay which directly addresses reasons for the desire to conduct graduate work in earth sciences as well as the desire to participate in the M.S. program at UNC Charlotte. Applicants should comment on their expectations regarding the benefits of an M.S. in Earth Sciences. Lastly, applicants should address directly how the program at UNC Charlotte fits their career and/or professional goals and how they would benefit from and contribute to the M.S. in Earth Sciences at UNC Charlotte. The essay is very important in determining the applicant's commitment to graduate education and to a professional career in earth sciences or a related field. Careful preparation of the essay is time well spent.
4) Scores on the Graduate Record Exam: In general the Department expects minimum scores of 1000 on the combined verbal and quantitative portions of the Graduate Record Exam. Lower scores will not automatically exclude applicants if the remainder of the applicant's file is strong.
5) Transcripts of College Course Work: The transcripts are evaluated on the basis of performance in a range of earth sciences, physical sciences and mathematics courses in order to determine the applicant's preparation for graduate level course work.

Additional Requirements for International Applicants: Applicants whose native language is not English must score at least 557 (paper based) or 220 (computer based) on the Test of English as a Foreign Language (TOEFL).

Prerequisite Requirements

Minimum Requirements for Students Entering the Program:

All prospective graduate students must demonstrate competence in undergraduate subject matter in their area of study. While the Department does not require that applicants have a degree in Earth Sciences, prospective graduate students should provide evidence that they are prepared to immediately take full advantage of graduate level course work in Earth Sciences.

Students applying to the program should, at a minimum, be familiar with the concepts and materials offered in courses such as: Physical Geography, Physical Geology, Earth History, Introductory Chemistry, Introductory Physics, and calculus-based Mathematics. These courses or their equivalents are required for admission to the UNC Charlotte M.S. in Earth Sciences program. Courses in Computer Sciences are also considered important. Any student wishing to pursue additional training in Geographic Information Systems (GIS) should have basic cartography preparation and computer file management and data base skills.

All decisions concerning the equivalency of courses in an applicant's transcript to those listed as minimum requirements for entry in the M.S. in Earth Sciences are the responsibility of the Graduate Committee and the Department Chair.

Assistantships

Assistantships are much like a part-time job for the student. As we try to find work settings that fit the student's academic interest, these assistantships can also offer valuable training opportunities and work experience. The nature of a research assistantship depends entirely on the needs of the supervising faculty member. Teaching assistantships are assigned on the basis of the student's academic background.

Graduate assistantships are arranged for either one entire semester or for an entire academic year (2 semesters or 9 months). They are normally scheduled for 16 weeks per semester and the student is expected to work 20 hours per week. The Department makes every effort to provide funding to every full-time student in the program.

Degree Requirements

The program requires a minimum of 36 hours of graduate credit. Up to six graduate credits may be accepted as transfer credit. Only courses with grades of A or B earned at an accredited university are eligible. Transfer credits are not automatic and require the approval of the Graduate Coordinator and the Graduate School. The amount of transfer credit may not exceed the limit set by the Graduate School (6 hours).

A student is expected to achieve A's or B's in all course work taken for graduate credit and must have at least an average of B (3.0) in order to graduate. A grade of "C" in any course will result in the student being placed on academic probation. An accumulation of more than two marginal "C" grades will result in suspension of the student's enrollment in the graduate program. A grade of "U" will result in the immediate suspension of that student's enrollment in the graduate program. Readmission to the program would require approval of the Graduate Coordinator, Department Chair and Dean of the Graduate School.

The student must complete at least 18 of the 36 credit hours in courses at the 6000-level or above. Of these at least nine credits will consist of 6000-level applied research. Students can select one of three options: 1) a 9-credit research thesis; 2) a community/industry based 9-credit internship; or 3) two faculty directed research projects ranging from 3 to 6 credits each. Students also must pass a two-part comprehensive examination covering 1) general aspects of the Earth Sciences discipline, and 2) a defense of one research project before receiving the M.S. degree.

Elective Courses

We anticipate that students will select electives from among civil engineering, biology, chemistry, physics and geography courses in support of particular emphases within our program. For example, certain geotechnology or waste disposal courses in Civil Engineering may be appropriate for the student pursuing problems in environmental earth sciences. Students examining the interaction of geology and the biosphere may include ecology or botany courses in the Biology Department or organic chemistry courses in the Chemistry Department in their program of study.

Advising

Upon admission to the program each student is assigned an initial faculty advisor from the student's declared area of interest. This advisor guides the student through the design and implementation of a program of study tailored to the student's specific needs and career goals. The advisor generally is available to the student for advice on academic and other problems. Students must confer with their advisors regularly concerning academic matters.

Once the student has become familiar with the program and the faculty, it is possible to change advisors by obtaining prior approval from the faculty member with whom the student wishes to work. Advisors are chosen to match, as nearly as possible, the student's academic and career interests. No student will be allowed to register for classes without the signature of his/her advisor.

All students are required to formulate a complete plan for their M.S. after completion of 18 hours. This plan will include at a minimum the names of the student's thesis or internship committee members, or the names of faculty sponsoring the directed studies, a plan of study for coursework that will be completed during the degree, and a brief proposal of the research project(s). The course of study and the research proposal(s) must be approved by the student's research committee as well as the Earth Sciences Graduate Coordinator, and serves as a guide to their course of study and research while at UNC Charlotte.

Committees

All final research projects are evaluated by a faculty committee known as the research committee. Research committees must have a minimum of three members composed of the graduate faculty of the Department or associated departments. Additional members are acceptable and in many cases outside members, other departments, or internship coordinators from off-campus agencies are advisable.

Concentration Descriptions and Courses

Concentrations are designed to aid in the focus of study for students who have clear ideas of the direction that they foresee taking in the future. The concentrations are Solid Earth Sciences, Climatology and Hydrology, and Environmental Systems Analysis. There are no specific course requirements for the three concentration areas. A program of study that fits the needs of the individual student will be arranged between the advisor, the student's committee and the student.

This Masters in Earth Sciences graduate program generally follows a traditional numbering scheme with

5000 and 6000 level courses. The 5000 level numbers identify courses that cover accepted bodies of knowledge within the earth sciences with the emphasis placed on mastery and critical assessment of the theoretical and empirical foundations within the discipline. The 6000 level courses are divisible into two categories. The first category is the Earth Systems topic courses wherein graduate students review and analyze the dominant current working hypotheses that drive contemporary research within conceptual areas such as geodynamics, global biogeochemical cycles, or climate change. The second 6000 level category is the directed research courses. This category provides the framework for graduate students to complete the research requirements within the program and also identifies the area of concentration of the directed research. This framework permits the assignment of appropriate faculty for research supervision.

Solid Earth Sciences

Overview

The Solid Earth Sciences concentration offers course work in Environmental Geology, Geochemistry, Geologic Mapping, Geomorphology, Hydrogeology, Mineralogy, Petrology, Remote Sensing, Sedimentology, Soil Science, Stratigraphy, Structural Geology, and Tectonics.

This concentration prepares students for licensure as Professional Geologists and for employment in the environmental consulting, energy and mining industries as well as government agencies charged with assessing natural resources and monitoring their utilization. The concentration also prepares those students who choose to undertake further graduate study or become earth sciences teachers.

Course Work

The following courses are available in the concentration in Solid Earth Sciences:

ESCI5170	Fundamentals of Remote Sensing
ESCI5180	Digital Image Processing in Remote Sensing
ESCI5210	Soil Science
GEOL5100	Igneous and Metamorphic Petrology
GEOL5105	Geomorphology
GEOL5110	Stratigraphy
GEOL5115	Applied Geophysics
GEOL5120	Geologic Mapping and Interpretation
GEOL5125	Geologic Summer Field Camp
GEOL5130	Optical Mineralogy
GEOL5135	Tectonics
GEOL5145	Hydrogeology
GEOL5165	Aqueous Geochemistry
GEOL5175	Geochemistry
GEOL5185	Mineralogy, Economics and the Environment
GEOL5410	Applied Soil Science
GEOL6101	Earth Systems Analysis: Geodynamics
GEOL6102	Earth Systems Analysis: Paleoenvironments
GEOL6103	Earth Systems Analysis: Solid Earth Geochemistry
GEOL6651	Workshops in Geology
GEOL6800	Individual Study in Geology

Research Credit Options

GEOL6110	Directed Research in the Solid Earth Sciences
GEOL6120	Directed Internship in the Solid Earth Sciences
GEOL6130	Thesis Research in the Solid Earth Sciences

Climatology and Hydrology

Overview

The Climatology and Hydrology concentration offers course work in Aqueous Geochemistry, Biogeochemistry, Climatology, Erosion Studies, Geomorphology, Hydrology, Hydrogeology, Meteorology, Remote Sensing, Stream Geomorphology and Watershed Science.

This concentration prepares students for careers in both the private and public sectors concerned with the study, management and regulation of water and air resources. Examples of such careers include water quality modeling, water supply analysis, forest hydrology, watershed management, storm water studies, stream restoration, erosion control, underground storage tank permitting and groundwater remediation, environmental regulation and planning, and weather prediction. This concentration is also of interest to secondary school Earth Sciences educators who wish to pursue advanced studies in atmospheric and hydrological sciences. The program will also prepare students who wish to pursue additional graduate study at the Ph.D. level in hydrological and/or atmospheric sciences and biogeochemistry.

Course Work

The following courses are available in the concentration in Climatology and Hydrology:

ESCI5140	Hydrologic Processes
ESCI5150	Applied Climatology
ESCI5155	Fluvial Processes
ESCI5170	Fundamentals of Remote Sensing
ESCI5180	Digital Image Processing in Remote Sensing
ESCI5222	Watershed Science
ESCI6060	Earth Sciences Field Investigations
ESCI6201	Earth Systems Analysis: Climate
ESCI6202	Earth Systems Analysis: Biogeochemical Cycles
ESCI6250	Urban Air Quality
GEOL5105	Geomorphology
GEOL5145	Hydrogeology
GEOL5165	Aqueous Geochemistry

Research Credit Options

ESCI6210	Directed Research in Climatology and Hydrology
ESCI6220	Directed Internship in Climatology and Hydrology
ESCI6230	Thesis Research in Climatology and Hydrology

Environmental Systems Analysis

Overview

The Environmental Systems Analysis concentration offers course work in Environmental Geology, Environmental Site Characterization, Geographic Information Systems, Planning, Remote Sensing, Soil Science, Spatial Decision Support Systems, Stream Restoration, and Water Resources.

This concentration prepares students for employment in the environmental consulting industry, government agencies charged with assessing and monitoring land use, water and air quality, and storm water monitoring. The concentration also prepares those students interested in further graduate work or a career as an earth sciences teacher.

Course Work

The following courses are suggested for the concentration in Environmental Systems Analysis:

ESCI5140	Hydrologic Processes
ESCI5155	Fluvial Processes
ESCI5170	Fundamentals of Remote Sensing
ESCI5180	Digital Image Processing in Remote Sensing
ESCI5210	Soil Science
ESCI5222	Watershed Science
ESCI5233	Geoenvironmental Site Characterization
ESCI6060	Earth Sciences Field Investigations
ESCI6301	Earth Systems Analysis: Human-interactions
ESCI6302	Earth Systems Analysis: Statistical and Risk-based Decision Support Systems
GEOL5105	Geomorphology
GEOL5115	Applied Geophysics
GEOL5120	Geologic Mapping and Interpretation
GEOL5135	Tectonics
GEOL5145	Hydrogeology
GEOL5175	Geochemistry
GEOL5410	Applied Soil Science
GEOG5120	Introduction to Geographic Information Systems
GEOG5130	Advanced Geographic Information Systems
GEOG5165	Environmental Planning
GEOG6615	Advanced Seminar in Spatial Decision Support Systems

Research Credit Options

ESCI6310	Directed Research in Environmental Monitoring and Decision Support Systems
ESCI6320	Directed Internship in Environmental Monitoring and Decision Support Systems
ESCI6330	Thesis Research in Environmental Monitoring and Decision Support Systems

Thesis/Internship/Directed Research Projects

Charlotte is located within short driving distance of classic geologic features including pristine barrier islands and the impressive relief of the Blue Ridge Escarpment and the Great Smoky Mountains. Continued growth in the Charlotte region has also resulted in numerous student opportunities for environmental, mining and water-resources research. Students can pursue research experiences that are appropriate to departmental faculty resources, individual student's programs, and the availability of opportunities that exist to work with allied agencies or clients on or off campus. One of three options will be available: 1) a nine credit hour traditional academic thesis; 2) a nine credit hour research experience which involves either a paid or unpaid internship arranged with a public or private agency or client; or 3) two research projects of 3 to 6 credit hours each. The research projects will be supervised by individual faculty members and will total a minimum of 9 credit hours. Each of these options fulfills program requirements equally. In all cases, students must work closely with their advisor and program committee to choose the option which best fits both their particular program and prevailing circumstances.

Thesis Option: The thesis option allows the student to pursue a single research problem in an area of his/her individual interest. Students who ultimately plan to pursue a Ph.D. degree might be more inclined and encouraged toward that option. The same is true of students who wish to complete their master's program with that kind of individual research activity. Completion of the thesis includes adhering to the requirements of the UNC Charlotte Graduate School as well as the requirements of the Department of Geography and Earth Sciences.

Internship Option: Students may opt to complete a research option that involves working on an applied project as an intern for a consulting firm or a government agency. Not every student can expect to engage in a paid internship because the number of students frequently exceeds a matching number of opportunities funded in that manner. Unpaid internships provide the same caliber of experience and training in an applied environment. In some cases, that experience may link students with non-profit agencies that simply do not have the resources to fund an internship. In either case, the topic of the internship is defined by the client's problem or needs.

Directed Research Option: Students may choose to complete two faculty directed research projects, usually one three credit and one six credit project. These research projects must be based in at least two of the three program concentrations (i.e. Solid Earth, Climatology and Hydrology, and Environmental Systems Analysis). See the Earth Sciences Graduate Handbook for more details.

Comprehensive Examination

To complete the program, each student must pass a two-part comprehensive examination covering 1) general aspects of the discipline, and 2) a defense of their adopted research project. It is the responsibility of the advisor for the thesis project, internship, or the larger of the research projects, in consultation with the student, to arrange each of the exams. In every instance, before either part of the exam can be administered, every member of the graduate faculty of the Department must receive written notification.

The Written Exam

Part I of the comprehensive exam is a written exam in which the student must respond to questions submitted by the faculty. These questions will examine knowledge from at least two of the program concentrations. The questions are solicited from the entire graduate faculty of the Department by a memo from the student's primary research advisor who then administers the examination. The written comprehensive exam is normally taken during the third semester (for full-time students) and in no case should the student take this exam before accumulating 27 hours of course work including courses in progress. This exam may not be administered if the student has outstanding incomplete grades in any graduate course work.

The Defense of the Research Project

Part II of the comprehensive exam is the defense of the research project (either thesis, internship, or one directed research project). This exam is generally administered at the discretion of the student's advisory committee and the student. When the advisor is satisfied that the student's research and writing has progressed sufficiently the research document is provided to the other members of the research committee. If they agree that the document is ready for a defense, an oral exam is scheduled. The advisor must then notify, in writing, every member of the Department's graduate faculty of the date, time, place and the topic (title with abstract) of the defense.

Admission to Candidacy Requirements

An application for admission to candidacy should be filed upon successful completion of a minimum of 18 semester hours of graduate work and no later than four weeks prior to the beginning of the semester in which the student expects to complete all requirements for the degree. Completed forms should be forwarded to the Graduate School.

Courses In Earth Sciences And Geology

Earth Sciences

ESCI 5000. Selected Topics in Earth Sciences. (1-4) Prerequisites: ESCI 1101, GEOL 1200-1200L, or permission of the instructor. In-depth treatment of specific topics selected from one of the fields of the earth sciences. May be repeated for credit as topics vary. *(On demand)*

ESCI 5140. Hydrologic Processes. (4) Prerequisite: ESCI 1101 or GEOL 1200-1200L or permission of the instructor. Atmospheric, soils and geologic aspects of surface and ground water processes. Three lecture hours and one three-hour lab per week. *(Fall)*

ESCI 5150. Applied Climatology. (3) Prerequisite: ESCI 3250 or consent of instructor. Methods of acquiring and analyzing climatic data in various types of applied problems. Emphasis on methods to assess and reduce the impact of weather and climate upon human activities. *(Spring)*

ESCI 5155. Fluvial Processes. (4) Prerequisites: ESCI 1101-1101L, GEOL 1200-1200L, or permission of the instructor. Hydrologic and geomorphic study of the transport of water and earth materials within stream systems. Erosion, mass wasting, open channel flow, sediment transport, flooding, stream channel morphology, morphometry of drainage basins, and related topics. Three lecture hours, three lab hours per week. *(Spring)*

ESCI 5170. Fundamentals of Remote Sensing. (4) Prerequisite: ESCI 1101 and GEOL 1200, or consent of the instructor. Physical fundamentals of remote sensing and overview of airborne and satellite systems operating in the visible, infrared, and radar regions, and a review of applications for resource exploration, environmental studies, land use and land cover analysis, and natural hazards. One 2-1/2 hour lecture, and one three-hour lab per week. *(On demand)*

ESCI 5180. Digital Image Processing in Remote Sensing. (4) Prerequisite: ESCI 5170 or consent of instructor. Scientific and computational foundations of digital image processing techniques for extracting earth resource information from remotely sensed data. Three lecture hours and three lab hours per week. *(Spring)*

ESCI 5210. Soil Science. (4) Prerequisites: GEOL 3124, GEOL 3115 or permission of instructor. Study of soils, soil-forming processes and soil morphology with an emphasis on soils as they relate to geologic landscapes and surficial processes. Students will learn how to describe and interpret soils in the field. Three hours lecture, three hours lab per week with occasional field

trips. Graduate students will fulfill the requirements of ESCI 4210. In addition, graduate students will be required to acquire laboratory and interpretive skills in soil chemical analyses and will have additional writing assignments for the course. *(Fall)*

ESCI 5222. Watershed Science. (3) Prerequisites: ESCI 4140/5140 or permission of the instructor. Examination of the cycling of water and chemical elements in natural and perturbed watersheds with emphasis on linkages between the hydrologic and biogeochemical processes which control runoff water quality. Topics include runoff processes, evapotranspiration, nutrient export and stream, riparian and hyporheic zone hydrochemical dynamics. *(On demand)*

ESCI 5233. Geoenvironmental Site Characterization. (4) Prerequisites: Earth Sciences, Geology and M.A. Geography majors: ESCI 4140 or 4155. Others require consent of the instructor. Advanced field-based examination of hydrologic and geologic conditions in the southeastern United States within the context of current state and federal regulatory requirements and site characterization activities currently performed by professional environmental geoscientists. Hydrologic investigation and water quality characterization, and geological and geophysical site investigations. *(On demand)*

ESCI 5250. Advanced Dynamic Meteorology. (3) Prerequisites: ESCI 3250 and ESCI 3251, or instructor consent. An extension of ESCI 3250 to provide an in-depth examination of atmospheric dynamics, focusing on the structure and evolution of synoptic scale dynamical and convective weather systems, and atmospheric modeling. Three hours of lecture per week. *(Fall, On demand)*

ESCI 5251. Advanced Synoptic Meteorology. (3) Prerequisites: ESCI 3250 and ESCI 3251, or instructor consent. An extension of ESCI 3251 sufficient to develop an integrated view of dynamic and synoptic meteorology. Included are a survey of conceptual models and analysis techniques for mesoscale atmospheric features, cumulus convection, and tropical storms. Three hours of lecture per week. *(Spring, On demand)*

ESCI 5400. Internship in Earth Sciences. (3-6) Prerequisite: consent of the Graduate Committee. Research and/or work experience designed to be a logical extension of a student's academic program. The student must apply to Graduate Advisory Committee for an internship by submitting a proposal which specifies the type of work/research experience preferred and how the internship will complement his or her academic program. The Graduate Committee will attempt to place the selected students in cooperating community organizations to complete specified research or work-related tasks which are based on a contractual arrangement between the student and community organization. The student can receive three to six hours credit, depending on the nature and extent of the internship assignment. *(On demand)*

ESCI 5800. Individual Study in Earth Sciences. (1-4) Prerequisite: permission of the instructor and credit hours established in advance. Tutorial study or special research problems. May be repeated for credit as topics vary. *(On demand)*

ESCI 6000. Selected Topics in Earth Sciences. (1-4) Prerequisites: permission of the Earth Sciences Graduate Coordinator. In-depth treatment of specific topics selected from one of the concentrations in earth sciences (Solid Earth Sciences; Climatology and Hydrology; Environmental Systems Analysis). May be repeated for credit as topics vary. *(On demand)*

ESCI 6060. Earth Sciences Field Investigations. (1-6) Prerequisite: consent of instructor. A concentrated field investigation of selected earth sciences topics. Course subject matter, credit hours, location and duration will be specified each time course is offered. May be repeated for credit. Pass/No Credit grading. *(On demand)*

ESCI 6201. Earth Systems Analysis: Climate. (3) Current working hypotheses and research methods are reviewed for the study of climatology and climate change. Theories and mechanisms of climate change, as well as the interrelationships between the components of the climate system, are discussed towards understanding and explaining past, present and possible future climatic behavior. *(On demand)*

ESCI 6202. Earth Systems Analysis: Biogeochemical Cycles. (3) This course examines the Earth's water and major elemental cycles including those of carbon, nitrogen, sulfur, phosphorus and the major crustal elements. Uncertainties in the current state of understanding of global elemental cycles are examined. Special emphasis is placed on how these cycles are currently being modified through human activities. *(On demand)*

ESCI 6210. Directed Research in Climatology and Hydrology. (3-6) A one or two semester research project, performed under the direction of a member of the faculty within Climatology and Hydrology. The project must be hypothesis-driven, and include formulation, implementation, analysis and presentation of research components. May be repeated for credit. Pass/Unsatisfactory grading. *(On demand)*

ESCI 6220. Directed Internship in Climatology and Hydrology. (9) Prerequisite: Consent of the Graduate Committee. Community/industry sponsored research/work experience in hydrological and/or climatological sciences with a well-defined applied research focus. While each internship may vary in its content, the student must submit and have approved a well-defined statement of research which details how the

internship will complement his or her academic program. Each proposal must identify both a community/industry research supervisor, and a faculty internship advisor. A final report detailing the research experience and results is required. Pass/Unsatisfactory grading. *(On demand)*

ESCI 6230. Thesis Research in Climatology and Hydrology. (9) Prerequisite: Consent of the Graduate Committee. The student will conduct hypothesis-driven research involving contemporary issues in Climatology and/or the Hydrological Sciences. This option is most commonly chosen when a student works under an assistantship in association with a funded faculty research project. The student will prepare and defend a traditional thesis upon completion of their research. A thesis proposal must be approved by the student's examination committee prior to registration for thesis credit. Pass/Unsatisfactory grading. *(On demand)*

ESCI 6250. Urban Air Quality. (3) Prerequisites: M.S. Earth Science, M.A. Geography, and Ph.D. INES and Public Policy students: ESCI 4150 and STAT 2221 or consent of instructor. Examination of the relationships between climatic processes and urban air quality with emphasis on trends and patterns. Topics will include health and environmental effects of air pollution, ozone climatology, pollutant transport, transportation related emissions, risk assessment, and air quality management. *(On demand)*

ESCI 6301. Earth Systems Analysis: Human Interactions. (3) Current working hypotheses and research methods are reviewed for the regional and global scale coupling of categorical human activities and earth processes. The focus is on GIS-based modeling frameworks for parametric impact assessment. *(On demand)*

ESCI 6302. Earth Systems Analysis: Statistical and Risk-based Decision Support Systems. (3) Statistical and risk-based research/decision support methods are reviewed for local and regional environmental assessment and management. The focus is on parametric statistical analysis of large temporal and spatial datasets for the human-interface with the local and regional air, water and land resources. Valuation, ranking, prioritization, and indexing models for environmental management are also discussed. *(On demand)*

ESCI 6310. Directed Research in Environmental Monitoring and Decision Support Systems. (3-6) A one or two semester research project, performed under the direction of a member of the faculty within the environmental monitoring and decision support systems area. The project must be hypothesis-driven, and include formulation, implementation, analysis and presentation of research components. May be repeated for credit. Pass/Unsatisfactory grading. *(On demand)*

ESCI 6320. Directed Internship in Environmental Monitoring and Decision Support Systems. (9) Prerequisite: Consent of the Graduate Committee. Community/industry sponsored internship in the area of environmental monitoring and decision support systems with a well-defined research focus. While considerable flexibility exists in the research problem design, each internship must have a well-defined statement of the research problem wherein the independent research to be performed by the intern is clearly stated. In addition both a community/industry research supervisor, and a faculty internship advisor must be identified prior to registration. Pass/Unsatisfactory grading. *(On demand)*

ESCI 6330. Thesis Research in Environmental Monitoring and Decision Support Systems. (9) Prerequisite: Consent of the Graduate Advisory Committee. Traditional hypothesis-driven research thesis focused on contemporary issues in the area of environmental monitoring and decision support systems. This option is most commonly chosen when a graduate student works under a research assistantship in association with a funded faculty research project. A thesis proposal must be approved by a faculty member in the Environmental Monitoring and Decision Support Systems area prior to registration for thesis credit. Pass/Unsatisfactory grading. *(On demand)*

ESCI 6650. Workshop in Geography. (4) A series of lectures on the subject matter of the atmosphere and hydrosphere with accompanying laboratory sessions. *(On demand)*

ESCI 6800. Individual Study in Earth Sciences. (1-4) Prerequisite: permission of the instructor and credit hours established in advance. Tutorial study or special research problems. May be repeated for credit as topics vary. *(On demand)*

ESCI 7999. Master's Degree Graduate Residence. (1) Permission needed from department.

Geology

GEOL 5000. Topics in Geology. (1-4) Prerequisites: ESCI 1101, GEOL 1200-1200L, or permission of the instructor. In-depth treatment of specific topics selected from one of the fields of geology. May be repeated for credit as topics vary. *(On demand)*

GEOL 5100. Igneous and Metamorphic Petrology. (4) Prerequisite: GEOL 3115. Classification, mineralogy and chemical properties of igneous and metamorphic rocks including the tectonic processes by which they formed. Lab emphasizes hand specimen and petrographic description and interpretation of rocks in thin sections. *(On demand)*

GEOL 5105. Geomorphology. (3) Prerequisite: ESCI 1101; GEOL 1200 and 1200L. Surficial processes and landform development as controlled by climate, tectonics,

rock characteristics and time with emphasis on plate tectonic, weathering, erosion, mass wasting, surface water, groundwater, glacial, wind coastal processes and climate change in landscape development. *(On demand)*

GEOL 5105L. Geomorphology Laboratory. (1) Prerequisite or co-requisite: GEOL 5105. Analysis of landforms and the surficial processes responsible for landform development. One lab period of 3 hours per week. *(On demand)*

GEOL 5110. Stratigraphy. (4) Prerequisites: GEOL 1210 and 3124. Vertical and horizontal relationships of layered earth materials as a key to understanding basin history, past depositional environments and their transformation through time. Three lecture hours, three lab hours per week. *(Spring)*

GEOL 5115. Applied Geophysics. (4) Prerequisites: GEOL 3115, 3130 and introductory physics or consent of instructor. Instrumental analysis of the earth's physical parameters. Study of human-induced seismic and electrical signals, and natural magnetic and gravitational fields for the purposes of locating faults, ore bodies, ground water and other earth hazards or resources. Three hours of lecture and one two-hour lab per week. *(On demand)*

GEOL 5120. Geologic Mapping and Interpretation. (4) Prerequisites: GEOL 3130 and 5100 or consent of instructor. Field and lab oriented study using principles of mineralogy, petrology and structural geology. Involves collection and resolution of field data, techniques of presenting data, development of geologic maps, and critical reviews of existing literature. Two hours of lecture, four hours of lab/field work per week. *(Alternate years)*

GEOL 5125. Geologic Summer Field Camp. (6) Prerequisite: Consent of instructor. Concentrated field investigation of geologic features. Data collection in the field, geologic mapping, report and map preparation and time management. Location of field camp will be specified each time course is offered. *(Summer)*

GEOL 5130. Optical Mineralogy. (4) Prerequisite: GEOL 3115. Light optics theory, the behavior of plane polarized light in a solid medium. The laboratory emphasizes the use of petrographic microscope oil immersion techniques and identification of the common rock forming minerals. Three hours of lecture and one three-hour lab per week. *(On demand)*

GEOL 5135. Tectonics. (4) Prerequisite: GEOL 3130 or consent of the instructor. A systematic examination of the evolution and dynamics of the earth from the perspective of plate tectonics theory. Three lecture hours, one three-hour lab per week. *(Alternate years)*

GEOL 5145. Hydrogeology. (4) Prerequisites: GEOL 1200, MATH 1241, CHEM 1251 or consent of instructor. Fundamentals of groundwater hydrology. Principles of flow and transport in groundwater aquifiers and the vadose zone. Topics include: storage, compressibility, capillarity, Darcy's Law, aquifer parameters, steady and transient flow equations, well hydraulics, geological controls on groundwater flow, and transport of non-reactive chemical species by advection, diffusion and dispersion in porous media. A series of experiments and problems illustrating flow and transport in porous media, together with applied problems. Three hours of lecture, and three hours of lab per week with occasional field trips. *(Fall)*

GEOL 5165. Aqueous Geochemistry. (4) Prerequisites: CHEM 1251 and 1252 and GEOL 3115, or consent of instructor. Interaction of rocks, minerals, and gases with water under natural conditions, including an overview of the compositions of natural waters from a variety of environmental and geologic settings emphasizing a rigorous thermodynamic approach to understanding water-rock interactions. Three hours of lecture, three hours of lab per week. *(Fall)*

GEOL 5175. Geochemistry. (3) Prerequisites: GEOL 1200, 1200L and Chemistry 1251 or consent of instructor. Geochemical survey of origin, evolution and present composition of the earth. *(Alternate years)*

GEOL 5175L. Geochemistry Laboratory. (1) Prerequisite or corequisite: GEOL 5175 or consent of instructor. Analytical methods and sample preparation techniques used by geochemists. One three hour meeting per week. *(On demand)*

GEOL 5185. Mineralogy, Economics and the Environment. (3) This course will focus on the origin, distribution, and consumption rate of the Earth's mineral resources. This lecture-based class will promote an understanding of not only the geologic, engineering and economic factors that govern mineral production, but also the resulting environmental pollution problems. *(Alternate years)*

GEOL 5410. Applied Soil Science. (4) Prerequisites: ESCI 4210/5210 or permission of the instructor. Students will read and discuss current literature pertaining to the application of soils to various fields of research such as surficial processes, active tectonics, ecology, stratigraphy, archaeology, and environmental assessment. Topics covered will vary depending on the interests of the students. Students will create and execute a semester-long soils-based field or laboratory research project of their choosing. Graduate students will fulfill the requirements of GEOL 4410. In addition, graduate students will have additional writing assignments throughout the semester. Graduate students' semester project must contain both field and laboratory

components. Three hours seminar, three hours field or lab each week. *(On demand)*

GEOL 6101. Earth Systems Analysis: Geodynamics. (3) Current working hypotheses and research methods are reviewed for the study of crustal and lithospheric processes on time scales from the seismic cycle to the long-term geologic evolution of basins and mountain belts and on physical scales ranging from the fracture and flow of rock masses to regional deformation and mountain building. *(On demand)*

GEOL 6102. Earth Systems Analysis: Paleo-environments. (3) Current working hypotheses and research methods are reviewed for the study of paleo-environments. The interrelationships of tectonics, paleogeography, biogeography, and orbital climate forcing, as represented in the geologic record, are discussed and reviewed in light of modern concerns for climate change. *(On demand)*

GEOL 6103. Earth Systems Analysis: Solid Earth Geochemistry. (3) Current working hypotheses and research methods are reviewed for the study of the geochemical evolution of the Earth's continental and oceanic crust. Hypotheses regarding coupling between solid earth geochemical processes and the evolution of the Earth's atmosphere and oceans are also briefly discussed. *(On demand)*

GEOL 6110. Directed Research in the Solid Earth Sciences. (3-6) A one or two semester research project, performed under the direction of a member of the faculty within the Solid Earth Sciences. The project must be hypothesis-driven, and include formulation, implementation, analysis and presentation of research components. May be repeated for credit. Pass/Unsatisfactory grading. *(On demand)*

GEOL 6120. Directed Internship in the Solid Earth Sciences. (9) Prerequisite: Consent of Graduate Committee. Community/industry sponsored research/work experience in the Solid Earth Sciences with a well-defined applied research focus. While considerable flexibility exists in the research problem design, the student must submit and have approved a well-defined statement of the research and how this will complement his or her academic program. In addition, the proposal must identify both a community/industry research supervisor, and a faculty internship advisor. Pass/Unsatisfactory grading. *(On demand)*

GEOL 6130. Thesis Research in the Solid Earth Sciences. (9) Prerequisite: Consent of the Graduate Committee. Hypothesis driven research on contemporary issues in the Solid Earth Sciences. This option is most commonly chosen when a student works under an assistantship in association with a funded faculty research project. The student will prepare and defend a traditional thesis. A thesis proposal must be approved by the Graduate Committee prior to registration for thesis credit. Pass/Unsatisfactory grading. *(On demand)*

GEOL 6651. Workshops in Geology. (4) A series of lectures on subject matter of the lithosphere and space science with accompanying laboratory sessions. *(On demand)*

GEOL 6800. Individual Study in Geology. (1-4) Prerequisite: Permission of the instructor and credit hours established in advance. Tutorial study or special research problems. May be repeated for credit as topics vary. *(On demand)*

GEOL 7999. Master's Degree Graduate Residence. (1) Permission needed from department.

ENGLISH

Department of English

275 Fretwell
704-687-2296
http://www.uncc.edu/engldept/

Degree

M. A., Certificates

Coordinator

Dr. Tony Jackson

Graduate Faculty

Deborah Bosley, Associate Professor
Lil Brannon, Professor
Paula Connolly, Associate Professor
Boyd Davis, Professor
Christopher Davis, Associate Professor
Susan Gardner, Associate Professor
Elizabeth Gargano, Assistant Professor
Leon Gatlin, Associate Professor
Sandra Govan, Professor
Robert Grey, Associate Professor
Aaron Gwyn, Assistant Professor
Tony Jackson, Associate Professor
Cy Knoblauch, Chair, and Professor, Department of English
Jeffrey Leak, Assistant Professor
Ronald F. Lunsford, Professor
James Holt McGavran, Professor
Kirk Melnikoff, Assistant Professor
Margaret Morgan, Associate Professor
Anita Moss, Professor
Jennifer Munroe, Assistant Professor
Aimee Parkison, Assistant Professor
Malin Pereira, Associate Professor
Alan Rauch, Associate Professor
Blair Rudes, Associate Professor
Anthony Scott, Assistant Professor

Daniel Shealy, Professor
John Staunton, Assistant Professor
Ralf Thiede, Associate Professor
Mark I. West, Professor
Greg Wickliff, Associate Professor

MASTER OF ARTS IN ENGLISH

The master's program in English is designed to accommodate a wide variety of students: those seeking personal enrichment through increased knowledge and understanding; those preparing to pursue a Ph.D. in English or other advanced professional degrees; and those seeking professional advancement in such fields as writing, publishing, or teaching on the primary, secondary, or college levels. The Department offers a broad range of courses in literature, writing/rhetoric, and language, including second language studies and applied linguistics. The Department also offers concentrations in children's literature and technical/professional writing.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for study in English:

1) Thirty hours of undergraduate coursework in English beyond the freshman level, or evidence of equivalent academic preparation for graduate study in English, as approved by the Department.
2) A satisfactory score on the Aptitude portion of the Graduate Record Examination or on the Miller Analogies Test.

Degree Requirements

The program requires a minimum of 36 semester hours of graduate credit with grades of A or B. (A course in which a graduate student receives a grade of C is not allowable as part of the 36 required hours.) At least 18 semester hours must be in English courses at the 6000-level, open only to graduate students. A student must choose one of these emphases: literature, writing/rhetoric, applied linguistics, or a concentration in either children's literature or technical/professional writing.

Courses beyond 36 hours of graduate credit may be required to remove deficiencies or to satisfy requirements for graduate licensure, or may be recommended to develop areas of need, to pursue particular interests, or to gain specific experience.

Of the 36 hours of graduate credit, 30 must be in English courses; the remaining 6 hours may be taken in English or in another discipline. If the hours are to be taken outside of English, the student must submit a written request to the Coordinator of Graduate Studies, explaining how these hours will enrich his/her program.

No more than 6 hours of ENGL 6890 (Directed Reading), may be applied to the degree without written permission of the Chair of the Department.

Assistantships

A number of graduate assistantships are available each year. Applications must be submitted by March 15 for assistantships beginning the following academic year. Further information is available in the Department.

Internships

ENGL 5410. The Department of English offers a number of internships for graduate students (limited to 3 hours of credit), which provide program-related experience in local television and radio stations, non-profit and government agencies, and local businesses and corporations. Further information is available in the Department.

Advising

The graduate coordinator and other graduate faculty member acting as his/her designated assistant will advise graduate students.

Licensure

Students seeking licensure in English should refer to the requirements of the M. A. in English Education program.

Comprehensive Examination

Students must satisfactorily complete a written examination based on a reading list keyed to their chosen emphasis. These lists are available in the Department office. The written examination may not be attempted sooner than the last semester of coursework, exclusive of thesis credits. The reading lists were revised for students entering the program in Spring 2002 and thereafter.

Thesis

The M.A. thesis is optional; it may be either scholarly or creative. See course description for ENGL 6996.

Tuition Waivers

Each year, one out-of-state tuition waiver is available for a new graduate assistant. In-state tuition waiver funds are also available for new graduate assistants and sometimes for other outstanding applicants.

Core Courses

All M.A. candidates, regardless of which concentration or emphasis is chosen, are required to take ENGL 6101 (Introduction to English Studies) and ENGL 6160 (Introduction to the English Language).

Emphasis Descriptions

The Literature Emphasis

The literature emphasis includes five literature courses, at least three of which are historically oriented. Two of these courses must be in one national literature and a third in a

different national literature. In addition, one writing/rhetoric course, one literary theory-intensive course, and three electives are required.

The Writing Emphasis
The writing emphasis includes four writing/rhetoric courses, one writing/rhetoric theory-intensive course, two literature courses, and three electives. The writing emphasis may focus on creative writing, technical/professional writing, or writing and pedagogy.

The Applied Linguistics Emphasis
The Applied Linguistics emphasis includes two writing/rhetoric courses, two literature courses, and four courses selected from the following:

ENGL5161 Modern Grammar
ENGL5165 Language and Culture
ENGL5166 Comparative Language Studies for Teachers
ENGL5260 History of the English Language or:
ENGL6162 History of the English Language
ENGL5263 Linguistics and Language Learning
ENGL6163 Language Acquisition
ENGL6161 Introduction to Linguistics
ENGL6070 Topics in English (Approval of Graduate Coordinator required)

In addition, students will choose one course from the following:

ENGL5050 Topics in English (linguistics topics only)
ENGL5254 Teaching English/Communications Skills to Middle and Secondary School Learners
ENGL5400 English Composition Practicum
ENGL5264 Literacy in Community/Family
ENGL6195 Teaching College English

The Technical/Professional Writing Concentration

Students accepted into the MA in English program may elect a concentration in Technical/Professional Writing. The curriculum includes 1) working for real clients; 2) learning Internet and Webpage design; 3) building project management and teamwork skills; and 4) learning applications such as Adobe PageMaker, PowerPoint, authoring tools, and word-processing systems.

Students will learn new computing applications, how to work as members of development teams, how to design and manage complex publication projects, both online and print, and how to assemble professional portfolios. Required courses include:

ENGL6116 Technical/Professional Writing (this class should be taken in the first year)
ENGL5180 Theories of Technical Communication
ENGL5410 Professional Internship
ENGL6008 Topics in Technical Communication (may be repeated for credit)
ENGL6166 Rhetorical Theory

15 hours selected from: 5181, 5182, 5183, 5204, 5205, 5008 (may be repeated for credit), 5852, 6062 (maybe repeated for credit), 6890, 6996,up to 6 hours of Creative Writing, Literature, or Linguistics courses

The Children's Literature Concentration

This concentration is premised on the assumptions that children's literature is an integral part of many literary traditions and that students studying children's literature should develop an understanding of the connection between children's literature and other forms of literature. Students will take:

6 hours in literature (not Children's Literature)
6 hours in writing/rhetoric
ENGL 6103 Juvenile Literature
12 hours selected from: 5102, 5103, 5104, 6104, 6890, 6996, 6070 (Children's Literature Winners), 5050 (topics that relate to Children's Literature), READ 6100, EDUC 5000 (Children's Literature across the Curriculum)
3 hours of an English elective

GRADUATE CERTIFICATE IN APPLIED LINGUISTICS

The Graduate Certificate Program in Applied linguistics enables professionals to focus and solidify or update their work with language teaching and research applications. As technology-supported applications of language theory increase, and as teaching and research opportunities change in response to demographic and educational demands both in the U.S. and in the global community, this Certificate grounds the participants in both current theory and practice and makes courses in the Applied Linguistics Concentration available to persons with related degrees and professional aspirations.

Admission Requirements

Students are admitted to the Graduate School in a special category for certificate programs. In addition to the general requirements to graduate certificate programs explained elsewhere in this Catalog, students will need to include a personal statement of purpose.

Certificate Requirements

The Graduate Certificate in Applied linguistics requires 15 hours in approved courses, including at least 6 hours at the 6000-level. A typical program might include 4 of the following courses: ENGL 5161 (Modern English Grammar), ENGL 5165 (Language and Culture), ENGL 6161 (Introduction to Linguistics), ENGL 6163 (Language Acquisition), ENGL 6195 (Teaching College English). Students must earn a grade of "B" or better in all courses presented for the certificate, and must complete the program within four years from the time of first enrollment in a certificate course.

Substitutions from the broader linguistics emphasis and graduate program will be allowed with approval of the Certificate Coordinator, who will act as adviser for those enrolled in the Certificate program.

Students whose dominant language is not English will elect coursework in Second Language Writing: Theory and Applications.

Transfer credits are not accepted in the Certificate program. Students seeking licensure for the teaching of English at levels K-12 should consult the College of Education.

GRADUATE CERTIFICATE IN TECHNICAL/PROFESSIONAL WRITING

The University of North Carolina at Charlotte offers a Graduate Certificate Program in Technical/Professional Writing designed for post-baccalaureate, graduate, and post-graduate students. Students can complete the required 21 graduate credit hours in approximately two years. Students will learn to design information, use hypermedia tools, create on-line support systems, design visuals, develop web pages, manage publications and projects, work with clients, develop portfolios, and learn page layout, graphics, and other software applications.

Admission Requirements

Students must apply for admission to the graduate school and must have a minimum undergraduate GPA of 2.75. Applicants will be required to submit: 1) a current GRE score; 2) a current MAT score; or 3) a portfolio of professional documents. Only graduate courses taken at UNC Charlotte will count towards this Graduate Certificate.

Certificate Requirements (9 hours):

ENGL6166	Rhetorical Theory
ENGL6008	Topics in Advanced Technical Communication
ENGL5410	Professional Internship

Electives (12 hours)

ENGL5180	Theories of Technical Communication
ENGL5181	Writing User Documents
ENGL5182	Writing & Designing Computer-based Documents
ENGL5183	Editing Technical Documents
ENGL5008	Topics in Technical Communication

Other Courses: as appropriate and approved by the Department

COURSES IN ENGLISH

ENGL 5002. Women and Literature. (3) Selected topics focusing on women and literature, such as images of women, women as writers, and women as literary critics. With permission of the English Department, may be repeated for credit as topics vary. (However, only six hours may be used for the requirements for the English major.) *(Yearly)*

ENGL 5008. Topics in Advanced Technical Communication. (3) Prerequisites: ENGL 2116 and COMM 1101. Exploration, both theoretically and practically, of the interrelation of written, oral and graphic communication within technical rhetorical contexts. May be repeated once for additional credit with the approval of the English Department. *(On demand)*

ENGL 5050. Topics in English. (3) Special topics not included in other courses. May be repeated for additional credit with approval of the English Department. *(On demand)*

ENGL 5090. Major Authors. (3) The works, ideas and life of one to three significant authors. With permission of the English Department, may be repeated once for credit as long as different authors are considered. *(On demand)*

ENGL 5102. Classics in British Children's Literature. (3) Focuses on pivotal works in the history of British and British Colonial Children's Literature. *(Fall)*

ENGL 5103. Classics in American Children's Literature. (3) Focuses on pivotal works in the history of American Children's Literature. *(Spring)*

ENGL 5104. Multiculturalism and Children's Literature. (3) Focuses on works that represent one or more kinds of cultural, ethnic, or social diversity of the United States and other national literatures. *(Fall)*

ENGL 5114. Milton. (3) A study of the major poems and selections from the minor works of Milton. *(On demand)*

ENGL 5116. Shakespeare's Early Plays. (3) A study of 10 representative plays from the comedies, histories and tragedies written 1590-1600. *(Yearly)*

ENGL 5117. Shakespeare's Late Plays. (3) A study of 10 representative plays from the period 1600-1611, including the late tragedies and tragi-comedies. *(Yearly)*

ENGL 5121. The 18th-Century British Novel. (3) The novel as narrative form and as mirror of the individual in society. Emphasis on fiction by Defoe, Richardson, Fielding, Sterne, Austen, with further readings in the novel of manners and the Gothic romance. *(On demand)*

ENGL 5122. The Victorian Novel. (3) Readings in British fiction during the triumph of the novel in the 19th century, emphasizing major developments in realism, romance, naturalism. *(Alternate years)*

ENGL 5123. The Modern British Novel. (3) Representative British novels that embody the cultural and literary developments of the 20th century: the impact of two world wars, the influence of important psychological and economic factors of modern life and their relationships to new techniques in art and literature. *(Alternate years)*

ENGL 5124. Modern Irish Literature. (3) Readings in Irish literature since 1885, with consideration of the mythology, folklore, and social history of Ireland as they are expressed in poetry, drama and fiction. *(On demand)*

ENGL 5131. British Drama to 1600, Excluding Shakespeare. (3) A survey of the development of British drama to 1600, with representative plays from the Mystery-Miracle Cycles, the Morality Plays, and Tudor drama, including Lyly, Kyd, Marlowe, Peele, Greene, Dekker. *(On demand)*

ENGL 5132. British Drama from 1600-1642, Excluding Shakespeare. (3) A survey of Jacobean and Caroline drama, including plays by Jonson, Beaumont and Fletcher, Webster, Middleton, Shirley, Ford. *(On demand)*

ENGL 5133. British Drama of Wit and Intrigue, 1660-1780. (3) The famous bawdy comedy of manners and the heroic drama of the Restoration, followed by the sentimental comedy and satiric burlesque of the 18th century. *(On demand)*

ENGL 5143. The American Novel of the 19th Century. (3) Major novelists and traditions from the beginnings of the American novel through the rise of realism, including such novelists as Hawthorne, Melville, Twain, Howells, James. *(Alternate years)*

ENGL 5144. The American Novel of the 20th Century. (3) Major novelists and traditions from the emergence of naturalism to the present, including such novelists as Crane, Dreiser, Hemingway, Faulkner. *(Yearly)*

ENGL 5145. Literature of the American South. (3) Selected works of Southern writers which reflect literary and cultural concerns from Colonial times to the present, including such authors as Poe, the early humorists, local color writers, Chopin, Faulkner, Warren, O'Connor, Welty. *(Yearly)*

ENGL 5146. Contemporary Jewish-American Literature. (3) An introduction to the scope and shape of the contemporary Jewish-American literary traditions. Such writers as Bellow, Malamud, Roth, Singer, and Potok will be studied. *(On demand)*

ENGL 5147. Early Black American Literature. (3) Prerequisite: ENGL 2301. A survey of significant writings by black Americans before the Harlem Renaissance. *(Alternate years)*

ENGL 5148. Twentieth-Century Black American Literature: Prose. (3) Intensive study of selected black American 20th-century writers of fiction and nonfiction, beginning with the Harlem Renaissance. *(Alternate years)*

ENGL 5150. Contemporary Poetry. (3) Poetry in English (including translations) since 1940. *(On demand)*

ENGL 5151. Modern Drama. (3) Representative Continental, British, and American plays, from Shaw to the present. *(On demand)*

ENGL 5152. Modern European Literature. (3) Selected modern European authors, translated into English, whose works have been of special interest to readers and writes of British and American literature. *(On demand)*

ENGL 5153. Contemporary Fiction. (3) Selected present-day fiction, with an emphasis upon works from outside the United States and Britain. Works not originally in English will be studies in translation. *(Alternate years)*

ENGL 5155. Pan-African Literature. (3) Introduction to significant Pan-African literature, emphasizing the oral tradition, selected works of major authors in the Caribbean and Africa, and the relationships of these traditions to American, British and other literary traditions. Works not originally written in English will be studies in translation. *(On demand)*

ENGL 5156. Gender and African American Literature. (3) Prerequisite: ENGL 2301, 3100 and 3200, or permission of instructor or graduate status. Exploration of the intersection of gender and African American Literature, focusing on either Black women writers or Black male writers, or a combination in dialogue. Cross-listed as AAA S 4106. *(On demand)*

ENGL 5157. African American Poetry. (3) Prerequisites: ENGL 2301, 3100 and 3200, or permission of instructor or graduate status. Intensive study of African American poetry, focusing on one period or traversing several. Cross-listed as AAAS 4107. *(Alternate years)*

ENGL 5158. African American Literary Theory and Criticism. (3) Prerequisites: ENGL 2301, 3100 and 3200, or permission of instructor or graduate status. History of an African American approach to literary analysis, including a practicum in modern criticism. Cross-listed as AAAS 4108. *(Alternate years)*

ENGL 5161. Modern English Grammar. (3) A study of the structure of contemporary English, with an emphasis on descriptive approaches. *(Alternate years)*

ENGL 5165. Language and Culture. (3) Readings in and discussion and application of the interrelationships between language and culture, including basic introduction to contemporary American dialects and to social contexts of language. *(Yearly)*

ENGL 5166. Comparative Language Studies for Teachers. (3) Prerequisite: ENGL 3132, or ENGL 6161, or permission of the Department. An introductory course designed to aid the teacher of English as a Second Language in comparing the systems of sound and structure of another language with those systems in English. *(Yearly)*

ENGL 5180. Theories of Technical Communication. (3) Prerequisite: ENGL 2116. Rhetorical, psychological, and anthropological theories which underscore the interrelations of written and graphic communication within technical, rhetorical contexts. *(Fall)*

ENGL 5181. Writing User Documents. (3) Prerequisite: ENGL 2116. Researching and analyzing audiences to write publishable instructions. This includes the production, testing, and revision of tutorials, reference manuals and on-line documents for users of computers and other devices. *(Spring)*

ENGL 5182. Writing and Designing Computer-based Documents. (3) Prerequisite: ENGL 2116. Theoretical and practical exploration of desktop publishing. Students will write and publish camera-ready documents by rhetorically integrating text and graphics using computer aids. *(Fall)*

ENGL 5183. Editing Technical Documents. (3) Prerequisite: ENGL 2116. Document editing, including copy editing, proofreading, substantive editing, and project management. *(Spring)*

ENGL 5202. Writing Poetry. (3) Prerequisite: ENGL 2126, or graduate status, or permission of instructor. Further study of and practice in the writing of poetry within a workshop format. May be repeated once for credit with the consent of the English Department. *(Fall, Spring) (Evenings)*

ENGL 5203. Writing Fiction. (3) Prerequisite: ENGL 2126, or graduate status, or permission of instructor. This course provides further study of and practice in the writing of fiction within a workshop format. May be repeated once for credit with the consent of the English Department. *(Fall, Spring) (Evenings)*

ENGL 5204. Expository Writing. (3) Writing of essays, criticism and various forms of exposition. *(Fall, Spring) (Evenings)*

ENGL 5205. Advanced Expository Writing. (3) Prerequisite: ENGL 5204. May be repeated once for credit with permission of the English Department. *(Alternate years)*

ENGL 5208. Poetry Writing Workshop. (3) Prerequisite: ENGL 5202. Designed for advanced writers of poetry. Focuses primarily on student work and peer criticism of it. May be repeated once for credit with permission of department. *(Yearly)*

ENGL 5209. Fiction Writing Workshops. (3) Prerequisite: ENGL 5203. Designed for advanced writers of fiction. Focuses primarily on student work and peer criticism of it. May be repeated once for credit with permission of department. *(Yearly)*

ENGL 5210. Greek and Roman Drama in Translation. (3) A study of selected plays of Aeschylus, Sophocles, Euripides, Aristophanes, Plautus, Terence, and Seneca with emphasis on dramaturgy and the development of the Greek and Roman theater. *(On demand)*

ENGL 5211. Chaucer. (3) The poetry of Geoffrey Chaucer, including the Canterbury Tales and Troilus and Criseyde. *(Alternate years)*

ENGL 5251. Literary Criticism Through Arnold. (3) The major schools and critics of literary criticism. *(On demand)*

ENGL 5252. Modern Literary Criticism. (3) Theories of the modern schools of criticism. *(On demand)*

ENGL 5254. Teaching English/Communications Skills to Middle and Secondary School Learners. (1-3) Approaches to the teaching of English, including recent theories and research related to writing and literary study, designed primarily for teaching in grades 6-12. *(Yearly)*

ENGL 5260. History of the English Language. (3) Origins and development of the English language, both spoken and written, from its earliest forms to contemporary usage. *(Alternate years)*

ENGL 5263. Linguistics and Language Learning. (3) Readings in, discussions of, and application of linguistically oriented theories of language acquisition, directed toward gaining an understanding of language-learning processes and stages. *(Yearly)*

ENGL 5264. Literacy in Family and Community. (3) Exploration of literacy issues and outreach in schools, agencies, and work sites. *(Alternate years)*

ENGL 5290. Advanced Creative Project. (3) Prerequisite: ENGL 5208 or 5209 or permission of the

instructor. The planning, writing, and polishing of a work of at least 20 pages of poetry or at least 40 pages of fiction or creative non-fiction by advanced undergraduate or graduate students with the guidance of a member of the Department's creative writing faculty. The final work may be a single piece or a collection of pieces and will evolve under the supervision of the primary instructor. With permission of the Department, students who took the course as undergraduates may repeat as graduate students. *(On demand)*

ENGL 5400. English Composition Practicum. (1-3) Prerequisite: consent of the instructor. Through supervised tutorial experience and seminars, this course introduces the student to current developments concerning composition and to a variety of methods for teaching English composition. This course is highly recommended for those planning to teach or those currently engaged in teaching. With permission of the English Department may be repeated once for credit. *(Fall, Spring)*

ENGL 5410. Professional Internship. (3 or 6) Prerequisites: permission of English Internship Coordinator. Restricted to juniors, seniors, graduate students majoring in English or minoring in English or communications who have at least a 2.5 GPA and a course in professional communication (e.g., journalism, technical communication, public relations, public relations lab, or mass media). Students work 8-10 hours (3 hours credit) or 16-20 hours (6 hours credit) per week in a placement arranged by the Internship coordinator. Only three credit hours may be applied to the English major at either the undergraduate or graduate level; three additional hours may be counted as a University or Communications elective. *(Fall, Spring, Summer)*

ENGL 5852. Independent Study. (1-3) Prerequisite: consent of the Department. Individual investigations and appropriate exposition of the results. (Unless special permission is granted by the Department Chair, no more than six hours may apply toward the English major.) May be repeated for additional credit with approval of the English Department. *(Fall, Spring, Summer)*

ENGL 6008. Topics in Advanced Technical Communication. (3) Theoretical and practical exploration of advanced topics in technical communication, including projects in which students write and publish documents by rhetorically integrating text, graphics, and other media using computer aids. *(Yearly)*

ENGL 6062. Topics in Rhetoric. (3) Examination of and/or research concerning selected issues in rhetorical theory or pedagogy. May be repeated for credit with English Department approval. *(Fall, Spring)*

ENGL 6070. Topics in English. (3) Selected topics of literature and language. May be repeated for credit as topics vary and with English Department approval. *(Fall, Spring)*

ENGL 6101. Introduction to English Studies. (3) The discipline of English--its nature, its history, and its methods. Emphasis on (1) the interrelations of literature, language, and writing; and (2) the diversity of cultural origins and critical perspectives in English studies, with concentration on selected major critical approaches. Intensive writing and practice in methods of research. Required of all M.A. in English students, preferably at or near the beginning of their programs. *(Fall, Spring)*

ENGL 6102. Literary Theory. (3) Modern literary theory focusing on the theoretical concepts which underpin literary analysis. Emphases may differ from semester to semester; readings will focus on major theoretical statements and on criticism which applies several approaches to particular literary works. Students will be required to apply what they have learned. *(Yearly)*

ENGL 6103. The Worlds of Juvenile Literature. (3) Covers a range of literature for children and adolescents including both historical and contemporary works. *(Yearly)*

ENGL 6104. Major Figures in Children's Literature. (3) Focuses on specific authors or illustrators who have made important contributions to the evolution of children's literature. *(Spring)*

ENGL 6111. Shakespeare's Comedies and Histories. (3) Source materials, textual problems and stage conventions in selected comedies and history plays illustrating Shakespeare's dramaturgy. *(Yearly)*

ENGL 6112. Shakespeare's Tragedies. (3) Source materials, textual problems and stage conventions of the great tragedies, illustrating Shakespeare's dramaturgy. *(Yearly)*

ENGL 6113. Milton. (3) The complete poetry and selections from the prose. *(On demand)*

ENGL 6123. The Augustan Age, 1660-1785. (3) Close reading of Dryden, Pope, Swift, Johnson,, and a consideration of other literary figures and trends, in the light of intellectual and historical currents. *(On demand)*

ENGL 6125. The Romantic Era, 1785-1832. (3) Development of the Romantic movement, with emphasis on the works of Wordsworth, Coleridge and other major poets. *(Alternate years)*

ENGL 6126. The Victorian Era, 1832-1900. (3) Emphasis on Tennyson, Robert Browning, Arnold, Carlyle, Ruskin, Newman. *(Alternate years)*

ENGL 6141. American Romanticism. (3) Major writers of the 1830s, 40s, and 50s, including Hawthorne,

Melville, Whitman, Emerson, Thoreau, and the Transcendental Movement. *(Alternate years)*

ENGL 6142. American Realism and Naturalism. (3) Major writers of the two movements before and after the end of the 19th century, including Twain, Howells, James, Crane, Dreiser, Norris. *(Alternate years)*

ENGL 6143. American Modernism. (3) Six to eight writers of the period since World War I, both prose and poetry. *(Alternate years)*

ENGL 6144. Stylistics. (3) Methodologies for analysis of the style of texts, with special emphasis on diction, syntax, prose, rhythm, voice, and metaphor. *(On demand)*

ENGL 6147. Perspectives in African-American Literature. (3) A survey of African-American literature, emphasizing the major authors, those relevant historical and social factors, and those specific literary movements that have influenced the development of African-American literature. *(Alternate years)*

ENGL 6160. Introduction to the English Language. (3) History and nature of English, its grammar, syntax, and lexicon. Integrates the study of language-based rhetorical and literary theory, asks students to consider the nature of language in general, its impact on the user, and the development of the systems of English, concentrating on features of major British and American dialects and registers. *(Fall, Spring)*

ENGL 6161. Introduction to Linguistics. (3) Introduction to linguistics, its techniques and objectives, descriptive and historical approaches, language families, language and culture. *(Yearly)*

ENGL 6162. History of the English Language. (3) Origins and development of spoken and written English, from its earliest forms to contemporary usage, with some attention to dialects and lexicography. (May not also receive credit for ENGL 4260.) *(Alternate years)*

ENGL 6163. Language Acquisition. (3) Prerequisite: ENGL 6160 or permission of the instructor. Linguistic theories of first and second language acquisition, including processes and stages of language development. (May not also receive credit for ENGL 4263.) *(Yearly)*

ENGL 6166. Rhetorical Theory. (3) Rhetorical theories, past and present, focusing on ways that these varied frameworks of understanding have informed the generation, understanding, and pedagogy of writing and other modes of discourse. Emphases will vary from semester to semester, readings will concentrate on major selected rhetorical theories and on implications of these theories for the understanding and pedagogy of discourse. *(Yearly)*

ENGL 6195. Teaching College English. (3) Examination of major issues in the theory and practice of literature and composition instruction at the college level. *(Yearly)*

ENGL 6274. Contexts and Issues in the Teaching of English. (4) Prerequisites: Admission to the Program. Examine the key concepts of the discipline. Consider own identities as readers, writers, teachers, researches, makers of meaning. Emphasis upon critical approaches and pedagogical issues, with special attention to technology in the teaching of language, composition, and literature, as well as cultural contexts for the study of English. *(Fall) (Evenings)*

ENGL 6495. Internship in College Teaching. (3) Prerequisite: ENGL 6195. Teaching in one section offered by the English Department under the supervision of English faculty. Students will be accepted for internship only near the end of the degree program and upon approval of the department. Students will be assigned to teach selected basic courses, and also will participate in periodic conferences and seminars. It is strongly recommended that students also take ENGL 4400 before ENGL 6195. *(Fall, Spring)*

ENGL 6674. Applied Research Methods in the Teaching of English. (4) Prerequisites: Completion of ENGL/EDUC 6274 and 12 hours of graduate credit toward this degree. Building on the research basis established in ENGL/EDUC 6274, this course provides the opportunity to apply research methods in classrooms. Examine identities as readers, writers, teachers, and especially as classroom researchers. *(Spring) (Evenings)*

ENGL 6680. Seminar in British Literature. (3) *(Yearly) (Evenings)*

ENGL 6685. Seminar in American Literature. (3) (Yearly) (Evenings)

ENGL 6890. Directed Reading. (1-3) *(Fall, Spring, Summer)*

ENGL 6974. Thesis/Project in the Teaching of English. (6) Research integrating the fields of English and Education in a theoretical or application-oriented study. If the thesis/project is the outgrowth of previous coursework, considerable additional research and exposition must be done. *(Department approval)*

ENGL 6996. Thesis. (6) Appropriate research and written exposition of that research, which may or may not be an outgrowth of work done in previous courses. If the thesis is the outgrowth of previous coursework, considerable additional research and exposition must be done beyond that previously undertaken. The proposed thesis work, as well as the final product, will be approved by a committee of three graduate faculty appropriate to the topic, appointed by the graduate coordinator after

consultation with the student, on the basis of a written proposal from the student. It is recommended that thesis work not be undertaken until near the end of progress toward the degree. The thesis title is to be shown on the student's final transcript. A Creative thesis option is available for students who have completed appropriate coursework in Creative Writing. (A statement of recommendations and requirements for form and procedures is available in the English Department office.) *(Fall, Spring, Summer)*

ENGL 7999. Masters Degree Graduate Residence. (1) *(Fall, Spring, Summer)*

ENGLISH EDUCATION

Department of English
(see previous listing under English)

Department of Middle, Secondary, and K-12 Education
College of Education Building, Room 324
704-547-3220

Degree
M.A.

Coordinator
Dr. Lil Brannon

MASTER OF ARTS IN ENGLISH EDUCATION

Designed for experienced middle and secondary English teachers, the M.A. in English Education qualifies graduates for the new Masters/Advanced Competencies "M" license in English Education. The program includes core courses team-taught by faculty in the English Department and the College of Education which focus on issues in the teaching of English and on research methods and advanced study in English and professional education, including a core course in teacher leadership.

Aligned with the 1997 North Carolina Excellent Schools Act and the proposition of the National Board for Professional Teaching Standards, the program prepares graduates to become master teachers who are (1) self-directed in their personal and professional growth as educators, (2) responsive to children's differences influenced by development, exceptionalities, and diversity, (3) well-grounded in the content and pedagogy of English/Language Arts curriculum, (4) self-reflective, self-evaluative, educational researchers, and (5) collaborative leaders.

Additional Admission Requirements
In addition to the general requirements for admission to the Graduate School, applicants must:

1) Hold the "A" license in Secondary English or Middle Grades Language Arts from the North Carolina Department of Public Instruction (or its equivalent from another state),
2) have at least two years experience of full-time teaching in the secondary or middle grades classroom,
3) an undergraduate GPA of 2.75 overall and 3.0 in the junior/senior years and thirty hours of undergraduate course work in English beyond the freshman level, or evidence of equivalent academic preparation,
4) a satisfactory essay that provides a statement of purpose for Master's degree study,
5) a personal interview

Degree Requirements
The M.A. in English Education Program requires completion of at least 38 semester hours of graduate credit with grades of A or B in approved courses including:

Core Course Requirements (14 hours)
ENGL/EDUC 6274 Contexts and Issues in the Teaching of English (4)
ENGL/EDUC 6674 Applied Research Methods in the Teaching of English (4)
ENGL/EDUC 6974 Thesis/Project in the Teaching of English (6)

Professional Requirements (12 Hours)
MDSK 6260 Principles of Teacher Leadership (3)

Also, 9 additional hours of graduate-level Education courses selected in consultation with the Program Coordinator. The program's 9 hours of professional courses are not free electives, but a planned program of study identified upon the students' enrollment in the program as part of the students' overall professional and program plan.

Content Specialization Requirements (12 Hours)
12 hours of graduate-level English courses selected in consultation with the Program Coordinator. The program's 12 hours of content specialization courses are not free electives, but a planned program of study identified upon the students' enrollment in the program as part of the students' overall professional and program plan.

At least 18 hours of course work in the program must be in English or Education courses at the 5000 level or higher.

Assistantships
Assistants are awarded on a competitive basis through the Department of English and the Department of Middle Grades, Secondary, and K-12 Education.

Capstone Experience
Students are required to complete a Master's Thesis/Project, a formal piece of scholarship, that investigates a particular problem in English education and attempts to provide either data-based practical solutions to the problem or a philosophical/theoretical exploration of the problem and its implications for the classroom. Following the approval from the students' thesis committee, the candidate must present the findings in a professional manner at a level expected of a master teacher.

Licensure
The M.A. in English Education qualifies graduates for the Masters/Advanced Competencies "M" license in English Education.

GEOGRAPHY

Department of Geography and Earth Sciences
448 McEniry Building
(704) 687-2295
http://www.geoearth.uncc.edu/

Degree
M.A.

Coordinator
Dr. Tyrel G. Moore

Graduate Faculty
Victoria Bowman, Professional Affiliate
Harrison Campbell, Jr., Associate Professor
Kenneth Chilton, Assistant Professor
Owen Furuseth, Professor
Laurie Garo, Lecturer and Professional Affiliate
Bill Graves, Assistant Professor
David Hartgen, Professor
Edd Hauser, Professor
Isaac Heard, Jr., Adjunct Professor
Gerald Ingalls, Professor and Chair
Jiyeong Lee, Assistant Professor
Ronald Kalafsky, Assistant Professor
Dennis Lord, Professor Emeritus
Tyrel Moore, Professor
Heather Smith, Assistant Professor
Jack Sommer, Professor Emeritus
Jamie Strickland, Lecturer and Professional Affiliate
Alfred Stuart, Professor Emeritus
Wayne Walcott, Associate Professor
Wei-Ning Xiang, Professor

MASTER OF ARTS IN GEOGRAPHY

The M.A. in Geography at UNC Charlotte emphasizes the application of geographic skills, methods, and theories to problem solving in contemporary society. To this end, students are offered a solid foundation in research methods, problem formulation and solution, quantitative methods, computer applications and Geographic Information Systems (GIS). Faculty and students are active in the community and students are encouraged to complete their programs with either funded or unfunded private or public sector internships.

One of the program's greatest strengths is the close relationship between its students and faculty and among the students themselves. Small class sizes, close student and faculty contact and a strong sense of community are considered essential components of the learning and teaching environment at UNC Charlotte.

The applied geography program at UNC Charlotte is recognized as one of the best of its kind in the country. Its graduates go directly into jobs as professional geographers, research and/or marketing specialists, location analysts, planners, transportation specialists, and consulting. About 10 percent of the more than 250 graduates of the program have gone on to study in Ph.D. programs.

Additional Admission Requirements
It is the policy of the Department to provide equal opportunities to all students regardless of race, creed, color, gender, or national origin. The Department maintains slightly different requirements than the general requirements for admission to graduate study at UNC Charlotte. The Department requires that applicants demonstrate evidence of suitability for the programs via evaluation in the five major areas listed below. These are weighted equally.

All applications for admission to the Geography M.A. Community Planning track will be reviewed by the Community Planning Track Interdisciplinary Entrance Committee. All other applications for admission will be reviewed by the Geography Graduate Advisory Committee. The Department will admit applicants on a competitive basis as space in the program allows and grant exceptions to the minimum standards if deemed in the best interests of the program.

1) Grade Point Average (GPA): In general, the Department would prefer an overall GPA above 3.1 (or a 3.1 for the last 2 years) and a GPA of 3.2 in the major. However, averages less than these will not exclude applicants if the other elements of the application are strong.

2) Letters of Recommendation: Three letters of reference are required. Letters from college or university teachers who have worked with and/or taught applicants are preferred. These letters will be evaluated on the basis of how well the applicant is suited in terms of intellect, motivation and temperament to do graduate course work.
3) Personal Essays: Applicants must write a personal essay which directly addresses why they wish to do graduate work in geography and why they wish to participate in the M.A. program at UNC Charlotte. They should address directly how the program at UNC Charlotte fits their career and/or professional goals and how they would benefit from and contribute to the M.A. in Geography at UNC Charlotte. This essay is very important in determining the applicant's commitment to graduate education and to a professional career in geography or a related field. Careful consideration of what goes into this essay is time well spent.
4) Scores on the Graduate Record Exam: In general, the Department would prefer scores in the range of 1000 or more on the combined Verbal and Quantitative portions of the GRE. Again, scores less than these suggested minimums will not automatically exclude applicants if the remainder of the applicant's file is strong.
5) Transcripts of College Course Work: The transcripts will be evaluated on the basis of types of courses attempted, range of geography, statistical and computer course work attempted. Not only will the applicant be evaluated on the strength of the performance in these areas, but also on the range, depth and suitability of the applicant's preparation for graduate level course work.

Additional Requirements for International Applicants: Applicants whose native language is not English must demonstrate their proficiency in English by taking the Test of English as a Foreign Language (TOEFL) examination. Overall scores of 575 with scores of 55 on individual sections (listening comprehension; structure and written expression; vocabulary and reading comprehension) are preferred.

Prerequisite Requirements

Minimum Preparation Suggested for Students Entering the Program:

All prospective graduate students must demonstrate competence in the undergraduate subject matter in their area of study. While the Department does not require that applicants have a degree in Geography, prospective graduate students should provide evidence that they are prepared to immediately take full advantage of graduate level course work in Geography.

Students applying to the program should, at a minimum, be familiar with the concepts and materials offered in courses such as basic Economic Geography, Introduction to Spatial Analysis, Location Theory, and Introduction to Research Methods or Statistics. Any student wishing to pursue additional training in Geographic Information Systems (GIS) should have basic cartography preparation and computer file management and data base skills. The relevant courses at UNC Charlotte are Maps and Graphs and Cartographic Lab.

The courses noted above are considered basic for admission to the UNC Charlotte Masters of Arts in Geography Program. Consequently, a student will normally not be considered prepared for graduate study without equivalent course work. Any student passing the above courses with a grade of B or better at UNC Charlotte or the equivalent courses from another university with a grade of at least B will not be judged deficient in these courses and will not be denied entry based solely on a lack of preparation. All judgments in this area are the responsibility of the Graduate Advisory Committee, the Community Planning Interdisciplinary Committee, and the Department Chair.

Assistantships

Graduate assistantships are arranged for either one entire semester or for an entire academic year (2 semesters or 9 months). They are normally scheduled for 16 weeks per semester and the student works 20 hours per week. Assistantships are funded at the rate of $4,500-$5,000 per semester. The Department makes every effort to provide funding to every full-time student in the program.

Degree Requirements

The M.A. in Geography requires a minimum of 36 semester hours of graduate work. Three specific courses (12 semester hours) are required of all students except those pursuing the Community Planning Track. Of the remaining 24 hours, a minimum of 12 hours must be completed through 5000-6000 level geography course work. Up to 12 hours may be taken in related work which includes all transfer credit, credit by exam, and course work in other departments at or above the 5000 level. At the discretion of the department, transfer credit totaling up to 6 hours may be accepted from accredited universities. No student may take more than 6 hours in graduate level independent study (GEOG 6800).

Required Courses (for all except the Community Planning Track)

GEOG6100 Quantitative Analysis in Geography (3)
GEOG6200 Research Design Fundamentals (3)
GEOG7900 Individual Research Project (6)

Elective Courses

1) Other 5000 or 6000-level courses in Geography -- a minimum of 12 hours
2) Related work (outside the Department) or transfer credits in courses numbered 5000 and above- maximum of 12 semester hours.

Advising

Upon admission to the program each student will be assigned a faculty advisor from the student's declared area

of interest. This advisor will help guide the student through the design and implementation of a program of study tailored to the student's specific needs and career goals. The advisor will be available to the student for advice on academic and other problems. Students must confer with their advisors regularly concerning academic matters.

More often than not, students will not work with the same advisor throughout the entire program. Once the student has become familiar with the program and the faculty, it is possible to change advisors by obtaining prior approval from the faculty member with whom the student wishes to work. Advisors should be chosen to match, as nearly as possible, the student's academic and career interests. No student will be allowed to register for a class without the signature of their "official" advisor.

All students are required to formulate a complete plan for their M.A. during preregistration for second semester. This plan must be approved by their advisor and will serve as a guide to their course of study while at UNC Charlotte.

Concentrations

Students may elect to study in one or a combination of three concentrations and one track. The concentrations are location analysis, urban-regional analysis, and transportation studies. The University's interdisciplinary Community Planning Track also is housed within the M.A. in Geography.

Location Analysis

Overview

The location analysis concentration offers course work in retail location, applied population analysis, facility siting, office and industrial location, trade area analysis, real estate development, location research, and regional economic development.

This concentration prepares students for jobs in location research with retail companies, real estate developers, consulting firms, commercial banks, and economic development agencies or for continued academic training in economic geography and location analysis. Courses are taught by practitioners in the career fields listed above.

Course Work

The following courses are suggested for a concentration in location analysis:

GEOG5108 Sport, Place and Development (3)
GEOG5155 Retail Location (3)
GEOG5255 Applied Population Analysis (3)
GEOG6000 Selected Topics in Economic Geography (3)
GEOG6030 Topics in Geographic Techniques (3)
GEOG6101 Store Location Research (3)
GEOG6102 Site Feasibility Analysis (3)
GEOG6103 Real Estate Development (3)
GEOG6104 Industrial Location (3)

Urban-Regional Analysis

Overview

The urban-regional analysis concentration offers course work in community development, regional development, GIS based analysis, site feasibility analysis, public facility siting, urban economics and social geography.

Students normally gain employment in public sector community development and economic development as well as the private sector.

Graduates of the M.A. in Geography program hold positions in a number of local and regional agencies in North Carolina and South Carolina as well as in other states such as California, Colorado, Connecticut, Florida, Georgia, Kentucky, New York, and Washington. They have responsibility for a broad range of development issues and tasks including economic development, geographic information systems, housing, land use, community and neighborhood analysis. Job placement for graduates has been very successful.

Course Work

Students normally choose courses from the following for a concentration in urban-regional analysis:

GEOG5101 Cartographic Techniques (3)
GEOG5103 Computer Mapping (3)
GEOG5108 Sport, Place and Development (3)
GEOG5120 Introduction to Geographic Information Systems (4)
GEOG5130 Advanced Geographic Information Systems (4)
GEOG5210 Urban Planning Methods (3)
GEOG5255 Applied Population Analysis (3)
GEOG5260 Transportation Policy Formulation (3)
GEOG5265 Transportation Analysis Methods (3)
GEOG6005 The Restructuring City (3)
GEOG6015 Topics in Regional Geography (3)
GEOG6102 Site Feasibility Analysis (3)
GEOG6103 Real Estate Development (3)
GEOG6104 Industrial Location (3)
GEOG6106 Urban Planning: Theory and Practice (3)
GEOG6116 Applied Regional Analysis
GEOG6615 Spatial Decision Support Systems (4)

Transportation Studies

Overview

Students in the transportation studies concentration can pursue course work in transportation systems analysis, policy formulation, impact analysis, and planning. This concentration prepares students for jobs in the public and private sector, usually as planners in the public sector and as analysts for transportation providers and for consulting companies in the private sector.

Job Prospects

Graduates with this concentration in transportation studies have taken positions with local and regional

planning agencies, consulting firms, and transit management companies across North Carolina and the U.S.

Course Work
The following courses comprise the transportation studies concentration:

GEOG5040 Transportation Topics (3)
GEOG5160 Geography of Transportation Systems (3)
GEOG5260 Transportation Policy Formulation (3)
GEOG5265 Transportation Analysis Methods (3)
GEOG5270 Evaluation of Transportation Impacts (3)

Selected courses offered by the Civil Engineering and Marketing Departments also are available for students in this program.

Community Planning
Overview
The Community Planning Track is structured to provide students with grounding in planning skills, methods and theory, and practical experience for careers in community planning. That structure is supported by interdisciplinary perspectives from core coursework in Architecture, Economics, Geography, and Public Administration.

Job Prospects
Graduates have been hired by local and regional planning agencies to give the track an excellent placement success rate. Perhaps a third of the students who pursue the program are practicing planners who wish to build and improve their professional skills.

Curriculum - Required hours 36 semester hours
The track comprises an interdisciplinary curriculum. Core requirements and approved electives are listed below:

Core coursework (21 hours, required of all students)
GEOG5210 Urban Planning Methods (3)
GEOG6040/
ARCH6050 Community Planning Workshop (3)
GEOG6100 Quantitative Analysis in Geography (3)
GEOG6106 Urban Planning: Theory and Practice (3)
ARCH5214 Dilemmas of Modern City Planning (3)
ECON6250 Advanced Urban and Regional Economics (3)
MPAD6128 Public Policy Analysis and Program Evaluation (3)

Elective Coursework (minimum 9 hours) from the following:
GEOG5120 Introduction to Geographic Information Systems (4)
GEOG5130 Advanced Geographic Information Systems (4)
GEOG5209 Small Town Planning (3)
GEOG5255 Applied Population Analysis(3)
GEOG5260 Transportation Policy Formulation (3)
GEOG5265 Transportation Analysis Methods (3)
GEOG5270 Evaluation of Transportation Impacts (3)
ARCH6050 The Architecture of Settlements (3)
ARCH6050 Public Spaces in Cities (3)
ARCH6050 Urban Transit and City Form (3)
ARCH7103/
ARCH7104 Urban Design Problems (Topical Studio) (5)
MPAD6102 Legal and Institutional Foundations of Public Administration (3)
MPAD6131 Public Budgeting and Finance (3)

Capstone Research Project (6 hours, required of all students)
GEOG7900 Individual Research Project (6) (taken in final semester)

Research Options

A common capstone research experience is not appropriate for all students. Instead, students should pursue research experiences that are appropriate to departmental faculty resources, individual student's programs and career goals, and the availability of opportunities that exist to work with allied agencies or clients on or off campus. One of three options, depending on the previously stated stipulations, will be available: 1) a research experience similar to that of a traditional academic thesis; 2) a research experience which involves a paid internship funded by and arranged with a public or private agency or client; and 3) a research experience involving an internship that is not funded, but arranged with a public or private agency or client. Each of these options fulfills program requirements equally. Each will produce a finished research effort of thesis quality.

Not every student can expect to develop a capstone research project that is similar to a traditional academic thesis. It does, however, provide a choice for students to pursue a research problem in a direction of his/her individual interest. Students who ultimately plan to pursue a Ph.D. degree might be more inclined and encouraged toward that option. The same is true of students who wish to complete their master's program with that kind of individual research activity. In all cases, students must work closely with their advisor and program committee to choose the option which best fits both their particular program and prevailing circumstances.

Not every student can expect to engage in a capstone research project that is a paid internship because the number of students frequently exceeds a matching number of opportunities funded in that manner. Unpaid internships provide the same caliber of experience and training in an applied environment. In some cases, that experience may relate student with non-profit agencies or social services that simply do not have the resources to

fund an internship. In either case, the topic of the internship is defined by the client's problem or needs.

Committees

All GEOG 7900 Research Projects are evaluated by a committee of faculty. Committees must have a minimum of three members composed of the graduate faculty of the department--or related departments. Committee members may include outside members from other departments or internship coordinators from off-campus agencies when appropriate.

Admission to Candidacy Requirements

The Admission to Candidacy form should be filed upon successful completion of a minimum of 18 semester hours of graduate work and in no case later than four weeks prior to the beginning of the semester in which student expects to complete all requisites for the degree. Completed forms forwarded to Graduate School must include a capstone research project title and the names of faculty who comprise the student's committee.

Comprehensive Examination

To complete the program, each student must pass a two part comprehensive examination covering both general aspects of the discipline and defense of the individual capstone research project. It is the responsibility of the advisor or committee chair, in consultation with the student, to arrange each of the exams.

The Written Exam - Part 1 of the comprehensive is a written exam in which the student must respond to three questions submitted by the faculty. These questions are solicited from the entire graduate faculty of the Department by a memo sent by student's advisor who then administers the examination. The written comprehensive exam is normally taken during the third semester (for full-time students) and in no case should the student take this exam before accumulating 27 hours of completed course work including courses in progress. This exam may not be administered if the student has outstanding incomplete grades in any course work.

The Defense of the (GEOG 7900) Individual Research Project - Part 2 of the comprehensive exam is the defense of the individual research project (GEOG 7900)—the capstone research project. This exam is generally administered at the discretion of the committee chair and the student. When the advisor is satisfied that the student's research and writing has progressed sufficiently the research document is provided to the other members of the independent research committee; if they agree that the document is ready for a defense, an exam is scheduled.

Courses In Geography

GEOG 5000. Topics in Geography. (3) Major topics in Geography. May be repeated for credit as topics vary. *(Yearly) (Evening)*

GEOG 5040. Transportation Topics. (3) Prerequisite: consent of department. Investigation of special topics in transportation including: transit systems, mobility and travel patterns, land use/transportation interface, air pollution, and information systems. *(Spring) (Alternate years)*

GEOG 5101. Cartographic Techniques. (3) Prerequisite: GEOG 2100. Preparation of maps, figures and charts at a professional level of competence. Techniques to be emphasized include desktop mapping with computers, high resolution imagesetting output, color separation techniques which include computer separations as well as scribing and various related photographic processes. Two laboratories of three hours each per week. *(Spring)*

GEOG 5102. Cartographic Design and Map Construction. (3) Design process and basic map construction techniques with particular emphasis on the graphic elements of map design, planning map design, creating visual hierarchies, the uses of color, and basic mechanical color separation. (Fall)

GEOG 5103. Computer Mapping. (3) Prerequisites: GEOG 2100 and CSCI 1100 or 1201 and its lab, or consent of instructor. Automated methods of gathering, storing, manipulating and displaying spatial data. Emphasis on the use of existing software and the design and implementation of geographic data structures and algorithms. *(Spring)*

GEOG 5108. Sport, Place and Development. (3) Prerequisites: GEOG 1105. Examines sport and its impact on the landscape of cities and communities. Implications of sport are examined in terms of urban use, urban social structure, markets, franchise movement and expansion, urban politics, its role in defining sense of place, and its impact on the development of communities and regions. *(Spring)*

GEOG 5120. Introduction to Geographic Information Systems. (4) Prerequisite: consent of instructor. Development, current state-of-the-art and future trends in geographic information processing with emphasis on data gathering, storage, and retrieval, analytical capabilities and display technologies. A laboratory component will include development and completion of an applied GIS research project. Additional requirements for graduate credit. Three lecture hours, one two-hour lab per week. *(Fall)*

GEOG 5130. Advanced Geographic Information Systems. (4) Prerequisite: GEOG 5120 or consent of instructor. Advanced GIS study with emphasis on (1) advanced skills for database development and management; (2) spatial analysis and modeling; and (3) Macro language programming and user interface design.

Three lecture hours and a two-hour lab session each week. *(Spring)*

GEOG 5155. Retail Location. (3) Spatial attributes of retailing and related activities. Location patterns, store location research, trade area delineation and consumer spatial behavior. *(Spring)*

GEOG 5160. The Geography of Transportation Systems. (3) Geographical and human factors that affect the movement of goods and people from place to place. Emphasis on transportation routes and networks, commodity flow patterns and the locational implications of freight rates. *(Spring)*

GEOG 5209. Small Town Planning. (3) This course will explore small town population dynamics, rural-urban fringe land use dynamics, and changes in small towns' community identity and sense of place. Emphasis will be placed on the issues and techniques that typify small town planning environments. Students will investigate these issues via field work and data collection at municipal scales within the Charlotte region.

GEOG 5210. Urban Planning Methods. (3) Prerequisite: GEOG 5205 or consent of the instructor. Scope and methods of urban planning. Emphasis on analytical techniques, projections, and data sources used in developing comprehensive planning tasks and strategies. *(Fall)*

GEOG 5240. Geography of Knowledge and Information. (3) Examination of the factors that influence the location of economic activities in the information age. Discussions and lectures explore the geographic aspects of the transition away from manufacturing to information processing as the primary mode of production. The transition is examined in terms of technology development, urban and regional development, information flows and the location of quaternary industry. *(Fall, On demand)*

GEOG 5255. Applied Population Analysis. (3) Population data sources; measuring population change; elementary projection and estimation techniques; spatial sampling; migration; survey design; applications in the public and private sectors. *(Fall)*

GEOG 5260. Transportation Policy Formulation. (3) Prerequisite: consent of department. Structure of transportation policy at federal, state, and local levels including policies concerning highway financing and investments, congestion, safety, and use and development, energy, transit, and the provision of intercity services. *(Fall) (Alternate years)*

GEOG 5265. Transportation Analysis Methods. (3) Prerequisite: consent of department; statistics recommended. Procedures for analyzing the operation and performance of transportation systems; includes network planning models, minimum path algorithms and assignments; energy, air pollution, and activity analysis models; and research approaches, data sources, time and activity budgets, infrastructure condition and needs assessment. *(Spring) (Alternate years)*

GEOG 5270. Evaluation of Transportation Impacts. (3) Prerequisite: consent of department. Methods and case studies for evaluating impacts and benefits of transportation investments including site-level impact analysis; project, corridor, and area scales; multi-modal evaluation and examination of mutually exclusive alternatives. *(Fall) (Alternate years)*

GEOG 5405. Urban Field Geography. (6) Prerequisite: six hours of urban-related undergraduate courses or permission of instructor. Intensive field studies of cities of the Carolinas, including one-day and overnight trips to cities of the mountains and coastal areas. Emphasis on day study trips within the Piedmont. Exercises include land-use mapping, trip journals, interviews and comparisons of the results of zoning and urban development practices within satellite cities of the Charlotte Metropolitan Statistical Area. *(Summer)*

GEOG 6000. Topics in Economic Geography. (3) Major topics in the location of economic activity. May be repeated for credit as topics vary. *(Yearly) (Evenings)*

GEOG 6005. Topics in Urban Geography. (3) Major topics in the form and structure of urban areas examined generally and in a specific local occurrence. May be repeated for credit as topics vary. *(Yearly) (Evening)*

GEOG 6010. Topics in Political Geography. (3) Major topics in the spatial aspects of political systems with special emphasis on urban and regional spatial patterns examined generally and in a specific local occurrence. May be repeated for credit as topics vary. *(On demand)*

GEOG 6015. Topics in Regional Geography. (3) Intensive examination of major spatial questions in a given region. May be repeated for credit as topics vary. *(On demand)*

GEOG 6030. Topics in Geographic Techniques. (3) Cartographic, remote sensing, quantitative techniques or field techniques. May be repeated for credit as topics vary. *(On demand)*

GEOG 6100. Quantitative Analysis in Geography. (3) Multiple regression, trend surface, factorial analysis, cluster analysis, discriminant analysis. *(Fall) (Evenings)*

GEOG 6101. Store Location Research. (3) Prerequisite: GEOG 6100 or consent of instructor. Market area analysis and site evaluation methods, including the application of multivariate statistical models, spatial interaction-gravity models, and location-allocation techniques to the retail location analysis task. *(Spring)*

GEOG 6102. Site Feasibility Analysis. (3) Prerequisite: consent of instructor. Examination of factors affecting the feasibility of land parcels for commercial and residential development with emphasis on the physical evaluation of a given site, the market support for its intended use and the financial support for the proposed development. *(Fall)*

GEOG 6103. Real Estate Development. (3) Examination of the real estate development process. Identification and evaluation of the critical assumptions and issues related to market and site feasibility, financial feasibility, planning, acquisition, construction, and operation of economically viable commercial real estate projects. *(Fall or Spring)*

GEOG 6104. Industrial Location. (3) Addresses factors influencing the location of industrial and service activities. Classical theories of industrial location are augmented with contemporary interpretations of the economic landscape. Emphasis is placed on theoretical foundations and new developments in industrial location theory, patterns and trends of industrial location, the site selection process, community impacts of locational decision-making, and the role of governments. Patterns and trends are examined in regional, national, and international perspectives. *(Fall, Alternate Years)*

GEOG 6105. Applied Real Estate Development. (3) Prerequisite: MBAD 6159/GEOG 6103/ARCH 5068. This course focuses on the application of the processes involved in real estate development. Students will work in groups on a semester project to select a site and prepare an appropriate development plan that emphasizes the market and financial feasibility of the real estate development. *(Fall or Spring)*

GEOG 6106. Urban Planning: Theory and Practice. (3) Alternative planning theories and application of theories in urban planning practices. *(Alternate years)*

GEOG 6110. Cartographic Preparation and Analysis. (3) Cartographic design and analysis of qualitative and quantitative data. Emphasis on preparation of maps, figures and charts. Techniques include scribing and various photographic processes. Two three-hour labs each week. *(On demand)*

GEOG 6116. Applied Regional Analysis. (3) Prerequisite: Basic computer skills including spreadsheets. Introduction to methods and techniques used in regional analysis. Topical areas include data sources and collection, regional delineation, community and regional profiles, regional accounts, methods of analysis and impact assessment. Topics are discussed in terms of theory, use, and role in economic geography and regional development. Emphasis is placed on application of economic and demographic methods at the regional level. *(Spring, Alternate Years)*

GEOG 6200. Research Design Fundamentals. (3) Scientific research and problem solving. Problem identification, bibliographic search, data sources and collection, techniques selection and preparation of reports and proposals. *(Spring) (Evenings)*

GEOG 6201. Analysis and Presentation of Research Data. (3) The student is required to complete a research project. Topics such as research critiques, preparation and presentation of research reports, and the development of geographic thought are considered. *(Fall) (Evenings)*

GEOG 6600. Seminar in Geography. (3) Study of the current trends in geographic thought and research methods. Pass/No Credit grading. *(On demand)*

GEOG 6615. Advanced Seminar in Spatial Decision Support Systems (SDSS). (4) Prerequisite: GEOG 5120 or consent of instructor. Theoretical aspects of spatial DSS including technical, social, political and psychological consideration; systems design; systems manipulation; and case studies. Three hours of lecture and one two-hour lab per week. *(Fall)*

GEOG 6643. Rural Development Issues. (3) Prerequisite: Permission of the instructor. This course provides research experiences that focus on policy formulation, and demographic, economic and planning issues in rural areas. *(Fall)*

GEOG 6800. Directed Problems in Geography. (1-4) Individual research into geographic topics. May be repeated one time. *(On demand)*

GEOG 7900. Individual Research Project. (6) Individual research report based on directed study of a topic of geographic significance. Pass/No Credit/ Unsatisfactory grading. *(Fall, Spring)*

GEOG 7999. Masters Degree Graduate Residence. (1) Permission needed from department. *(Fall, Spring, Summer)*

GERONTOLOGY

Interdisciplinary Program in Gerontology

704-687-4520
www.coas.uncc.edu/gerontology

Degrees

M.A. (Concentration in Planning and Administration is available), Certificate

Director and Coordinator

Dr. Dena Shenk

Graduate Faculty

Anita Blowers, Director, Office of Student Success and Retention and Associate Professor of Criminal Justice
Bill Brandon, Metrolina Medical Foundation Distinguished Professor of Public Policy in Health
Maren Coffman, Assistant Professor of Nursing
Boyd Davis, Bonnie E. Cone Professor of Teaching, Professor of English
Mark Dorfman, Professor of Finance and Business Law
Mark Faust, Assistant Professor of Psychology
Paul Foos, Professor of Psychology
Cynthia Hancock, Lecturer, Department of Sociology & Anthropology
Martin Kane, Associate Professor of Civil Engineering
JoAnn Lee, Associate Professor of Psychology
Julie McLaughlin, Assistant Professor of Sociology
Linda Moore, Associate Professor of Adult Health Nursing
Deanna Morrow, Associate Professor of Social Work
Jane Neese, Associate Dean for Academic Affairs, College of Health and Human Services
Gary Rassel, Associate Professor of Political Science
Dorothy Ruiz, Associate Professor of African-American and African Studies
Dena Shenk, Professor of Anthropology
Randy Swanson, Associate Professor of Architecture
Rosemarie Tong, Mecklenburg County Medical Society Distinguished Professor
Michael Turner, Associate Professor of Health Programs and Kinesiology
Carole Winston, Assistant Professor of Social Work
Diane Zablotsky, Associate Professor of Sociology

MASTER OF ARTS IN GERONTOLOGY

The Master of Arts in Gerontology is designed to prepare graduates with the knowledge and skills to fill a wide variety of positions in the developing field of aging. The Planning and Administration Concentration will best meet the needs of those planning to direct programs for older adults, and those interested in the development and administration of programs.

Potential students are encouraged to apply to begin the program in the fall semester, although applications are reviewed throughout the year. The program can be completed on either a full-time or part-time basis with all required courses and a selection of electives offered in the evening. Some courses may require prerequisites and it is the responsibility of the candidate to meet any prerequisites (e.g. statistics is a required prerequisite for GRNT 6201). Students will work in conjunction with their adviser and graduate committee to design and implement their individual program.

Additional Admission Requirements

Grade point average of at least 2.75 overall and 3.0 in courses in Gerontology.
Satisfactory GRE or MAT scores.
Three letters of recommendation from persons familiar with the applicant's personal and professional qualifications.
An essay is required describing the applicant's relevant experience and objectives in undertaking graduate study in Gerontology.

Prerequisite Requirements
Completion of at least one broad-based undergraduate course in Gerontology or the Professional Development Program in Gerontology previously offered through the Office of Continuing Education, Extension and Summer Sessions at UNC Charlotte.

Degree Requirements

The Gerontology Program requires 36 semester hours of graduate course work.

Core Courses (required, 21 hours)

GRNT6600	Current Issues in Gerontology (3)
SOCY6130	Sociology of Aging: Theories and Research (3)
PSYC6124	Psychology of Aging (3)
NURS6275	Health Promotion and Wellness for Older Adults (3)
GRNT6201	Research and Methods in Aging I (3)
GRNT6202	Research and Methods in Aging II (3)
GRNT6400	Practicum (3)

In addition to these core courses, each student will complete either a thesis or an applied project (GRNT 6999 or 6990).

Elective courses include the following:

GRNT5050	Topics in Gerontology (1-4)
GRNT5250	Programs and Services for the Aging (3)
GRNT6800	Independent Research Study (3) can be repeated, up to 6 credits can be counted towards MA electives
GRNT6210/ MPAD6210	Aging and Public Policy (3)
GRNT6211/ MPAD6211	Administration of Aging Programs (3)
HPKD5232	Physiology of Human Aging (3)
MPAD6128	Public Policy Analysis and Program Evaluation (3)
MPAD6172	Administration of the Health Care System in the U.S. (3)
NURS6115	Health Planning in the Health Care System (3)
GRNT5134	Families and Aging (3)
GRNT5150	Older Individual and Society (3)

Other electives may be selected in consultation with your adviser.

Comprehensive Examination
Each student will complete an oral comprehensive exam at the time of the thesis or applied project proposal defense.

Committee
Each student should select his/her Graduate Committee before completion of GRNT 6201.

Thesis or Applied Project
The thesis option entails 9 hours of elective credits and 6 hours of thesis credits (GRNT 6999). The student must also pass an oral defense of both the thesis proposal and thesis, and oral comprehensive exams at the time of the thesis proposal defense.

The applied project option generally entails 12 hours of elective credits and 3 hours of applied project credits (GRNT 6990).
The student must also pass an oral defense of both the applied project proposal and the project, and oral comprehensive exams at the time of the project proposal defense.

Financial Aid/Financial Assistance
The program offers the NMR Gerontology Graduate Scholarship annually with all application materials due by June 1.

Early Entry Program
Exceptional undergraduate students may be accepted into the master's of Gerontology and begin work toward a graduate degree before completion of the baccalaureate degree.

GRADUATE CERTIFICATE IN GERONTOLOGY

The Graduate Certificate in Gerontology is designed to provide graduate education in Gerontology for those who already have a graduate degree in another field or those currently completing a graduate degree in another field, who are interested in working with older adults. It requires completion of a set of core and elective courses related to the study of aging. Applications for admission the Graduate Certificate Program in Gerontology are considered as they are received and admissions are ongoing. Students are admitted to the Graduate School in a special category for certificate students.

Additional Admission Requirements
In addition to the general requirements for admission to a certificate program, applicants must provide official transcripts of all baccalaureate and graduate work attempted.

Three letters of recommendation are required from persons familiar with the applicant's personal and professional qualifications.
An essay is required describing the applicant's relevant experience and objectives in undertaking graduate study in Gerontology.

Degree Requirements
The Graduate Certificate Program requires completion of a minimum of 15 semester hours of graduate course work related to aging and older adults.

Core Course

GRNT6600 Current Issues in Gerontology (3)

Electives

Primary Electives (choose 2-3 of the following):

PSYC6124 Psychology of Aging (3)
SOCY6130 Sociology of Aging: Theories and Research (3)
NURS6275 Health Promotion and Wellness for Older Adults (3)

Secondary Electives (choose 1-2 from the following):

GRNT5050 Topics in Gerontology (1-4)
GRNT5250 Programs and Services for the Aging (3)
GRNT6210/ MPAD6210 Aging and Public Policy (3)
GRNT6211/ MPAD6211 Administration of Aging Programs (3)
GRNT 6400 Practicum (3)
HPKD5232 Physiology of Human Aging (3)
MPAD6128 Public Policy Analysis and Program Evaluation (3)
MPAD6172 Administration of the Health Care System in the U.S. (3)
NURS6115 Health Planing in the Health Care System (3)
GRNT5134 Families and Aging (3)
GRNT5150 Older Individual and Society (3)

Secondary electives may also be chosen from other appropriate courses as offered with the approval of the Gerontology Graduate Coordinator.

Transfer Credit
Transfer credit is not accepted toward a Graduate Certificate Program in Gerontology.

Courses In Gerontology

GRNT 5050. Topics in Gerontology. (1-4)
Investigation of specific issues in Gerontology, either from the perspective of a single discipline or from a multidisciplinary perspective. May be repeated for credit as topics vary. *(On demand)*

GRNT 5134. Families and Aging. (3) Theories explaining the formation and functioning of American

families with emphasis on the impact of the aging of society. Examination of the current demographic trends and expectations of multigenerational families, as well as the future demands and modifications. *(Yearly)*

GRNT 5150. Older Individual and Society. (3) Study of the social and cultural context on the lives of aging individuals in American society. Will include a focus on expectations, social interactions, and psychological well-being in the context of retirement, caregiving, and health *(Yearly)*

GRNT 5250. Aging Programs and Services. (3) Examination of federal, state and local framework of services and programs for the aging. Graduate students required to complete a more extensive final paper. *(On demand)*

GRNT 5260/WMST 5260. Women: Middle Age and Beyond. (3) Position of older women in society and the particular problems and issues for women as they age. *(On demand)*

GRNT 5270. Intergenerational Relationships & Programs. (3) Exploration of the importance of and consequences of intergenerational relationships and the range of programming currently available to encourage interaction between people of different ages. *(On demand)*

GRNT 6201. Research and Methods in Aging I. (3) Prerequisite: Statistics. Examination of variety of qualitative and quantitative methods used in research on aging and analysis of Gerontology research from a range of disciplines. Students will develop a working draft of their thesis-applied project proposal. *(Fall)*

GRNT 6202. Research and Methods in Aging II. (3) Prerequisite: GRNT 6201. Examination of the variety of qualitative and quantitative methods used in evaluation research in applied settings. Students will develop an evaluation project plan. *(Spring)*

GRNT 6238/PHIL 6238. Intergenerational Issues of Justice. (3) Examination of intergenerational issues of justice in public policy toward the elderly and their health care needs. Issues of justice and morality will be explored in terms of the distribution of limited health care resources among competing age groups. *(On demand)*

GRNT 6210/MPAD 6210. Aging and Public Policy. (3) Examination of the public policy making process with attention to aging policy. Consideration of determinants of aging policy and institution and actors in the policy making process and piecemeal development of legislation will be analyzed as factors related to the making of policy for the aged. *(Alternate years)*

GRNT 6211/MPAD 6211. Administration of Aging Programs. (3) Focus will be implementation of public policies and programs for the aged and the development and administration of these programs. Students will become familiar with the process through which policies are transformed into aging programs and the budgetary, management and evaluative considerations that must be taken into consideration. *(Alternate years)*

GRNT 6400. Practicum. (3) Completion of a field-based educational experience which relates to the student's career goals and objectives. Pass/Fail grading. *(Summer)*

GRNT 6600. Current Issues in Gerontology. (3) Study of current topics and issues in the field of Gerontology from an interdisciplinary perspective. An ethical framework will be used to examine the issues. *(Fall)*

GRNT 6800. Independent Research in Gerontology. (3) Graduate students meet individually or in small groups with the instructor and will complete readings and/or research on a topic in gerontology according to a contract. Attendance at lectures of an undergraduate class in Gerontology may be included among course requirements. May be repeated for credit up to a maximum of six hours. *(On demand)*

GRNT 6990. Applied Project. (3) Permission needed from program. Pass/Fail grading. *(Fall, Spring, Summer)*

GRNT 6999. Master of Arts Thesis. (3 or 6) Prerequisite: application for admission to the thesis option. A completed paper and oral presentation are required. Pass/Fail grading. *(Fall, Spring, Summer)*

GRNT 7999. Master of Arts Graduate Residency. (1) *(Fall, Spring, Summer)*

HISTORY

Department of History

113 Garinger Building
704-687-4633
http://www.uncc.edu/colleges/arts_and_sciences/history/

Degree

M.A., Ph.D. (joint degree with the University of Aberdeen)

Coordinator

Dr. Cynthia Kierner

Graduate Faculty (UNC Charlotte)

Cemil Aydin, Assistant Professor
Mario Azevedo, Professor
Jurgen Buchenau, Associate Professor
Karen Cox, Assistant Professor
Jerry Dávila, Associate Professor

Daniel Dupre, Associate Professor
Melissa Feinberg, Assistant Professor
Karen Flint, Assistant Professor
John Flower, Associate Professor
David Goldfield, Professor
Christine Haynes, Assistant Professor
James Hogue, Associate Professor
Lyman Johnson, Professor
Cynthia Kierner, Professor
Gregory Mixon, Associate Professor
Daniel Morrill, Professor
Steven Sabol, Associate Professor
John Smail, Professor
John David Smith, Professor
Robert Smith, Assistant Professor
Heather Thompson, Associate Professor
Peter Thorsheim, Assistant Professor
Mark Wilson, Assistant Professor

MASTER OF ARTS IN HISTORY

The Master of Arts Program in History at UNC Charlotte is designed to give motivated students an opportunity to pursue advanced studies in close collaboration with accomplished scholars. The program emphasizes the development of methodological, literary, and conceptual skills that graduates can employ as students in a doctoral program, as professionally oriented history teachers in secondary schools, as staff at museums or historic sites, or as citizens more acutely aware of the historical evolution of their society. Offering both day and evening courses, the Department of History attracts a diverse group of traditional and non-traditional students. Candidates may pursue the M.A. degree on either a full-time or part-time basis.

The Department offers courses in African, Asian, European, Latin American, and United States history, with particular expertise in the following areas:

American South, Old and New
Modern Europe
Gender, Race, and Slavery in Comparative Perspective
Latin America

The Department also offers a concentration in the field of Public History under the directorship of Dr. Karen Cox. The program emphasizes museum studies, historic preservation, and the creation of new media such as websites, CD-Roms, and digital images and document collections.

Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are ordinarily required for admission to the M.A. program in History:

1) A minimum undergraduate GPA of 3.0 in History or a related discipline.
2) Acceptable performance on the verbal and math portions of the GRE.

Degree Requirements

The Master of Arts degree in History requires completion, with a GPA of 3.0 or better, of at least 30 hours in approved graduate courses. These courses must include at least 24 credit hours in History, of which at least 15 hours are in seminars or colloquia open only to graduate students, and no more than 6 hours in individually designed readings or research courses. Students taking the comprehensive examination may take 3 hours of exam preparation and students completing a thesis may take 6 hours of thesis preparation toward their 30 hours.

Students who pursue the concentration in Public History must complete 30 hours of required and elective coursework, 3 hours for an internship in some area of Public History, and 3 hours of thesis work for a total of 36 hours.

Students must complete all degree requirements, including the comprehensive examination or thesis defense, within six calendar years of first enrollment in the program.

All students in the program are expected to maintain an overall B (3.0) average. Students who do not meet this expectation will be subject to suspension on recommendation of the Graduate Committee of the Department of History.

Admission to Candidacy Requirements

An Admission to Candidacy form must be submitted during the semester preceding the one in which the student plans to complete the degree requirements, either by defending a thesis or taking a comprehensive examination.

Assistantships

The Department of History supports eight students with teaching assistantships, two students with editorial assistantships, and another with an administrative assistantship for the History Freshman Learning Community. Assistantships are funded at $9,000 per academic year. From time to time, the Department also provides students with other assistantship opportunities.

See the sections on Tuition Waivers and Financial Assistance, below, for additional information on resources available to graduate students in the Department of History.

Internships

Internships are available to all students and required for those in the Public History program. Graduate students have done internships with the Mecklenburg County Historical Commission and the Journal of Urban History, both of which are headed by members of the

Department, and with a variety of local historical museums and sites. The Levine Museum of the New South, located in uptown Charlotte, and the Charlotte Museum of History, employ our students for research and design. Students also may serve as research assistants for members of the Department of History. See the Graduate Coordinator or the Director of Public History for internship opportunities.

Core Courses

All candidates for the degree must complete HIST 6693 (Historiography and Methodology) with a grade of B (3.0) or better. In addition, at least 6 hours of a student's History courses are expected to pertain to fields other than United States history.

In addition to those requirements, candidates pursuing the concentration in Public History must complete HIST 6310 (History Museums), HIST 6320 (Historic Preservation) and HIST 6330 (History in the Digital Age).

Electives

Students may elect to take up to 6 hours of graduate-level course work in disciplines other than History. Candidates seeking graduate-level teacher certification may use the elective option to take courses in professional education selected in consultation with the College of Education. If a student needs more than 6 hours to satisfy certification requirements, those hours will be added to the total required for the M.A. in History.

Advising

Students may not register for graduate-level courses without the permission of the Department of History. Consequently, students must be advised by the Graduate Coordinator, either in person or by phone or email, prior to registering for courses each semester, as well as prior to filing their admission to candidacy form and application for degree.

Transfer Credit

No more than 6 transferred hours may be approved for application to the requirements for the degree.

Language Requirement

Although students are not required to demonstrate proficiency in a foreign language, they are expected to be able to use whatever languages they need to pursue their research interests.

Thesis/Comprehensive Examination

After completing the required courses, students must either prepare a Master's thesis based on original primary research or take three comprehensive written examinations based on reading lists compiled in consultation with faculty members. In both cases, the candidate must then pass an oral examination based on their thesis or written examination.

An Examining Committee, consisting of two graduate faculty members from the Department of History and a third member selected from History or another department, oversees the student's thesis work or conducts the comprehensive written and oral examinations.

Tuition Waivers

The Department has two tuition waivers that enable out-of-state students to pay tuition at the in-state rate. There is also a modest pool of scholarship money for in-state students. The Department awards all waivers and scholarship money on a strictly competitive basis.

Financial Aid/Financial Assistance

Students may obtain limited financial support from paid internships, summer teaching in the Department, archival work in the library's Special Collections, and teaching opportunities at local community colleges. Students doing thesis research or presenting papers at professional conferences may receive modest travel grants from the Department or from the Graduate History Association.

Information on non-departmental forms of financial assistance is available from the UNC Charlotte Office of Financial Aid.

Courses In History

HIST 5000. Problems in American History. (3)
Prerequisite: HIST 2100 or permission of the department. A colloquium designed around a problem in American history, requiring reading, discussion, reports and a major paper. May be repeated for credit as topics vary. *(Fall, Spring) (Evenings)*

HIST 5001. Problems in European History. (3)
Prerequisites: HIST 2100 or permission of the department. A colloquium designed around a problem in European history, requiring reading, discussion, reports and a major paper. May be repeated for credit as topics vary. *(Yearly, Summer) (Evenings)*

HIST 5002. Problems in Non-Western History. (3)
Prerequisite: HIST 2100 or permission of the department. A colloquium designed around a problem in non-Western history, requiring reading, discussion, reports and a major paper. May be repeated for credit as topics vary. *(Yearly)*

HIST 5300. Introduction to Public History. (3)
Prerequisite: permission of the department. This course will provide an overview of the main subfields in the field of Public History. Students will learn the fundamentals of Museum Studies, Historic Preservation, and other fields at the discretion of the instructor. This course is the first in a sequence of required courses for graduate students doing the Public History concentration; it is also open to advanced undergraduates with the consent of the department. *(Yearly)*

HIST 6000. Topics in History. (3) Prerequisite: permission of the department. Intensive treatment of a period or broader survey of a topic, depending on student needs and staff resources. May be repeated for credit as topics vary. *(Fall, Spring) (Evenings)*

HIST 6151. Seminar on Colonial Latin American History (3) Prerequisite: permission of the department. A topical seminar devoted to selected themes in colonial Latin American history. This course provides an introduction to research methods, documentary sources, and the critical analysis of historical literature. Topics will change. Course may be repeated for credit. *(Alternate years)*

HIST 6152. Seminar in Modern Latin American History (3) Prerequisite: permission of the department. A topical seminar devoted to selected themes in modern Latin American history. This course provides an introduction to research methods, documentary sources, and the critical analysis of historical literature. Topics will change. Course may be repeated for credit. *(Alternate years)*

HIST 6196. Urban Systems for School Administrators. (3) Corequisite: POLS 6196. An interdepartmental, team-taught course which consists of a survey of the causes and consequences of urbanization in the United States with particular attention to the urban South. Urbanization is treated as a system linking historic, political, economic, and social factors, particularly since 1945. *(Summer)*

HIST 6200. History Teaching Alliance Institute. (3) Open under special arrangement. Pass/No Credit grading only. *(On demand)*

HIST 6210. Early America, 1607-1820. (3) Prerequisite: permission of the department. Development of American institutions from the period of English settlement through the establishment of Republicanism under the Constitution. *(Alternate years)*

HIST 6215. Jacksonian America, 1820-1848. (3) Prerequisite: permission of the department. Examination of important economic, social and political changes including industrialization, the rise of the Democratic Party and reform movements. *(Alternate years)*

HIST 6220. The Old South. (3) Prerequisite: permission of the department. Evolution of the Old South from the 17th century to its collapse in the Civil War and Reconstruction, focusing on southern distinctiveness and the tension between democracy and slavery. *(Alternate years)*

HIST 6225. The New South. (3) Prerequisite: permission of the department. Continuity and change in the South from the late-19th century, including industrialization, politics, class and race relations, and religion. *(Alternate years)*

HIST 6230. European Social History. (3) Prerequisite: permission of the department. Examination of the views of different writers on class formation, the rise of modern institutions, gender relations and social protest including why certain schools of thought such as modernization or Marxism become popular at particular historical moments. *(Alternate years)*

HIST 6240. U.S. Political and Economic History, 1865-1939. (3) Prerequisite: permission of the department. Emergence of the modern industrial economy and the concomitant development of a large bureaucratic federal government including big business, technological innovation, the labor movement, progressive reform and regulatory policies. *(Alternate years)*

HIST 6250. Comparative Slavery and Race Relations. (3) Prerequisite: permission of the department. Slavery in the New World through its abolition including Indian and African slaves, the slave trade, the economics of slavery, and the impact of slavery on modern race relations in the Americas. *(Alternate years)*

HIST 6265. Cold War America. (3) Prerequisite: permission of the department. Domestic and foreign policy problems accompanying the post-World War II struggle between East and West, Communism and capitalism including McCarthyism, modern technology, foreign aid, Korea, Vietnam, civil rights, gender roles and natural resources. *(Alternate years)*

HIST 6310. History Museums. (3) Prerequisite: permission of the department. This course introduces students to the management, curatorial, public relations, and fundraising aspects of historical museums and related historical sites. These skills will be acquired through readings, term projects, and a "hands-on" experience at local museums and historical sites. *(Yearly)*

HIST 6320. Historic Preservation. (3) Prerequisite: permission of the department. This course is an introduction to the theory and practice of identifying, preserving and restoring buildings, sites, structures and objects in the historic built environment of the United States. *(Yearly)*

HIST 6330. History in the Digital Age. (3) Prerequisite: permission of the department. This course analyzes the impact of new media technology on the discipline of history as well as well as the ways in which new media enhances the discipline by making history accessible to a much broader audience. This course will involve an individually-based new media project that will require students to learn to work as a team, important to their preparation for careers in public history settings. Coursework includes common readings of texts and

encounters with on-line studies, with emphasis on students' individual media projects. *(Yearly)*

HIST 6601. Graduate Colloquium. (3) Prerequisite: permission of the department. A colloquium focused on a theme or period. Assigned readings, short papers and reports directed toward developing research and writing skills. May be repeated for credit. *(Fall, Spring) (Evenings)*

HIST 6693. Historiography and Methodology. (3) Prerequisite: permission of the department. A study of historians and their philosophical and methodological approaches. Required of all M.A. candidates. *(Yearly) (Evenings)*

HIST 6698. Introduction to Historical Writing. (3) Prerequisite: permission of the department. Seminar on the process of thesis writing including thesis proposals, primary source materials, rules of evidence, structure of an argument, and organization of the thesis and its chapters. May be repeated for credit. *(On demand)*

HIST 6894. Readings in History. (3) Prerequisite: prior written consent of instructor. Coverage of historical periods or topics through individually designed reading programs; scheduled conference with a staff member. May be repeated for credit. *(Fall, Spring) (Evenings)*

HIST 6901. Directed Readings/Research. (3) Prerequisite: prior written consent of instructor and graduate coordinator. Graduate students will meet individually or in small groups with the instructor and will be assigned readings and/or research on a theme that relates to the lectures of an undergraduate class. Attendance at the lectures is a course requirement. May be repeated for credit. *(Fall, Spring, Summer)*

HIST 6997. Directed Research. (3) Prerequisite: prior written consent of instructor. Investigation of a historical problem culminating in a research paper. May be repeated for credit. *(On demand)*

HIST 6999. Thesis. (3 or 6) May be repeated by permission, if taken for three hours credit. Six hours of Thesis may be taken during a single semester. Appropriate research and written exposition of that research is required. *(On demand)*

HIST 7999. Master's Degree Residence. (1)

PH.D. IN HISTORY

Graduate Faculty (at University of Aberdeen)

Nathan Abrams, Lecturer
Cathryn Brennan, Teaching Fellow
Terry Brotherstone, Senior Lecturer
Edward Burton, Lecturer
Christoph Dartmann, Lecturer
Enda Delaney, Lecturer
David Ditchburn, Senior Lecturer
David Dumville, Professor
Marjory Harper, Reader
Howard Hotson, Professor
Rene Leboutte, Professor
Alastair Macdonald, Lecturer
Allan Macinnes, Professor
Andrew Mackillop, Lecturer
Ben Marsden, Lecturer
William Naphy, Senior Lecturer
Micheal OSiochru, Lecturer
Frederik Pedersen, Lecturer
Richard Perren, Reader
Edward Ranson, Lecturer
David Smith, Lecturer
Jane Stevenson, Reader
Joyce Walker, Teaching Fellow
Oonagh Walsh, Senior Lecturer
Philip Withington, Lecturer

Program of Study

This program combines the M.A. earned at UNC Charlotte, or an accepted institution, with a Ph.D. conferred by the University of Aberdeen in Scotland. After attaining their Master's degrees, qualified students will spend one year in Charlotte, one year in Aberdeen, and a third year at either of these two institutions. Ph.D. candidates will work with faculty and utilize research facilities in both America and Europe. Teaching and research assistantships are available on a competitive basis at both universities.

Both universities offer a wide range of courses and fields of specialization. As indicated above, the Department of History at UNC Charlotte possesses particular expertise in United States history, the history of the American South, Latin America, and the comparative history of medicine, race, gender, urbanization, and industrialization. The Department of History at the University of Aberdeen possesses particular expertise in the following fields: non-Anglocentric British history; the North Sea and Baltic states, including Russia; diet, disease, and death; gender; and the relationship between Scotland and America.

Additional Requirements for Admission

In addition to the general requirements for admission to the Graduate School, the following are the minimum requirements for graduate study in History at the doctoral level:

1) A GPA of 3.5 or better in all Master's level courses.
2) Above average performance on the math and verbal portions of the G.R.E.
3) Submission of the applicant's M.A. thesis or a substantial research paper.

Degree Requirements

The joint Ph.D. in History requires successful completion of a dissertation proposal, a qualifying examination, and a doctoral dissertation. Coursework for the joint Ph.D. will

consist primarily of directed reading and research in preparation for writing the dissertation.

All degree requirements, including the dissertation defense, should be completed in 3-4 years. All requirements must be completed within six years of enrolling in the program.

Assistantships
Teaching and research assistantships are available at both universities on a competitive basis. Applications for assistantships at UNC Charlotte should be submitted simultaneously with those for admission to the joint Ph.D. program.

Advising
Students may not register for graduate-level courses without the permission of the Department of History, which means that the Graduate Coordinator must register them for courses each semester. Regular advising by the graduate coordinator is especially essential to arrange continuous funding for doctoral students in Charlotte and in Aberdeen.

Qualifying Examination
Students are required to complete both written and oral qualifying examinations during their second semester at UNC Charlotte. The written examination will consist of a dissertation proposal; the oral examination will cover both the student's general field of specialization and the proposed dissertation topic.

Language Requirement
Although students are not required to demonstrate proficiency in a foreign language, they must possess the foreign language skills necessary to do primary research in their intended field of specialization.

Dissertation Defense
Doctoral dissertations are not to exceed 100,000 words in length. The dissertation defense is a final oral examination at which a student presents and defends his/her research before a committee of Aberdeen and UNC Charlotte faculty. The defense committee can reject the dissertation and instruct the student to revise the work or accept it and thereby confer the Ph.D.

Courses In History

(Doctoral students only)
HIST 8894. Readings in History. (3 or 6) Prerequisite: doctoral student with prior written consent of the instructor. Coverage of historical periods or topics through individually designed reading programs; scheduled conferences with a designated member of the graduate faculty. May be repeated for credit. *(Fall, Spring, Summer)*

HIST 8999. Dissertation. (3 or 6) Prerequisite: approval of dissertation topic by the student's advisory committee. Individual research that culminates in the preparation and presentation of a doctoral dissertation. May be repeated by permission up to 12 hours. Six hours of Dissertation may be taken during a single semester. Maximum of 12 hours allowed under this course designation. *(On demand)*

HIST 9999. Doctoral Degree Graduate Residence. (1) Maintains continuous enrollment as required by University policy. *(On demand)*

LIBERAL STUDIES

Department of Liberal Studies
103 Macy Building
704-547-4312

Coordinator
Dr. Dale Grote

Degree
M.A.

MASTER OF ARTS IN LIBERAL STUDIES

The Master of Arts degree program in Liberal Studies is designed primarily for adults seeking to enhance their general education in the liberal arts at the graduate level. It provides a flexible, multidisciplinary framework to accommodate the varied undergraduate backgrounds and personal interests that students bring to the program. The curriculum draws upon the full range of the humanities, social sciences, and natural sciences. The emphasis is on liberal arts education rather than on specialized study or professional training.

For recent recipients of the baccalaureate degree, the Liberal Studies program may provide the insight needed to make an informed career choice, or it may enhance opportunities in a career already launched. For returning students, graduate liberal studies may renew ties with university life or lead to a change of career. For persons with significant work experience, the program offers a chance to integrate the life of the mind with that of the workplace. Just as students come to the Liberal Studies program from a variety of fields, so they pursue a variety of careers after graduation. The most widely represented are in business, education, government, law, and social services.

Although the Liberal Studies program is not exclusively an evening program, the majority of courses are offered at times convenient for working adults. It is possible to

earn the degree in a timely fashion through evening courses only.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Liberal Studies:

1) A GPA of at least 2.75 on academic work beyond high school and 3.0 for courses prerequisite to the area of proposed graduate study.
2) Satisfactory scores on the Miller Analogies Test or the Verbal and Analytical portions of the Graduate Record Examination.
3) A two-page essay describing the applicant's objectives in undertaking graduate work in Liberal Studies.
4) A resume of employment history or volunteer experience (for applicants who have been out of school for at least five years or whose baccalaureate degree was delayed).
5) Acceptance into the program is contingent on an interview with members of the Liberal Studies Faculty Advisory Committee.

Degree Requirements

The master's program in Liberal Studies requires a minimum of 30 semester hours of graduate work with grades of A or B, including at least 15 semester hours in courses open only to graduate students. A course in which a student receives a grade of 'C' is not allowable as part of the 30 required hours.

The program begins with two core courses that give students some common grounding in the issues of liberal arts education. Each student then chooses a program emphasis by completing at least four courses that focus on a common theme. Degree requirements also include a Liberal Studies elective course and two elective courses that can be taken in any department in the College of Arts and Sciences. The program concludes with a seminar, a master's essay or project, and a comprehensive examination. The requirements are outlined below:

Core Courses

LBST6101 The Liberal Arts Tradition (3)
LBST6102 Ideas Across the Disciplines (3)

Program Emphasis

Four related courses focusing on a theme developed by the student and faculty advisor (12 hours).

Liberal Studies Elective 3 hours

General Electives 6 hours

Concluding Seminar

LBST6600 Liberal Studies Seminar (3)

No more than 6 hours of independent study may be applied to the degree. Students requesting independent study must have successfully completed at least 12 semester hours in the program, including LBST 6101 and 6102. A form for such requests is available in the Coordinator's office and must be completed and the study approved in advance of registration.

Comprehensive Examination

Each candidate concludes the program with a comprehensive examination taken during the final semester of course work. The examination is a part of the concluding seminar and is individually designed, based on each student's program. It allows the student to integrate material from a variety of disciplines and to demonstrate understanding of the scope of Liberal Studies.

Assistantships

A limited number of graduate assistantships are available each year. In order to be fully competitive, applications must be received by March 15. Application forms are available through the Graduate School.

Prizes

A Spring Prize of $250 is awarded annually for an outstanding paper or project completed for a LBST course. Only students admitted to the Liberal Studies program by the submission deadline for the prize are eligible.

Courses In Liberal Studies

LBST 6000. Topics in Liberal Studies. (3) Selected topics approached from interdisciplinary perspectives in the liberal arts. May be repeated for credit as topics change. Examples include interrelated courses forming program emphases on Language and Culture and on Religious Ideas in Physical Forms. *(Fall, Spring)*

LBST 6101. The Liberal Arts Tradition. (3) The concept of a liberal education and its relationship to human understanding as reflected in representative historical traditions, literature, art, and intellectual works. Examination of selected classics of the Western tradition and critiques through the use of works from other traditions and perspectives. *(Fall, Spring)*

LBST 6102. Ideas Across the Disciplines. (3) Enduring ideas and their impact on history, society and culture. Each semester a single idea is examined through a variety of writings spanning the liberal arts disciplines. Examples include the idea of nature, the idea of human nature, the idea of the democracy and the idea of citizen. *(Fall, Spring)*

LBST 6600. Liberal Studies Seminar. (3) An integration of the course work previously taken by each of the seminar members and the completion of a final essay or project. *(Yearly)*

MATHEMATICS

Department of Mathematics
376 Fretwell Building
704-687-2580
http://www.math.uncc.edu/grad/

Mathematics Degrees
M.S., Ph.D.

Mathematical Finance Degree
The Department of Mathematics is one of the participating departments in the Inter-College Master of Science in Mathematical Finance program. See the Mathematical Finance entry in the Inter-College Graduate Programs section of this *Catalog* for complete information and program requirements.

Coordinator for Mathematics
Dr. Joel D. Avrin

Mathematics Education Degree
M.A., Ph.D. in C&I: Math Ed Specialization

Coordinator for Mathematics Education
Dr. Victor V. Cifarelli

Graduate Faculty
Robert Anderson
Joel Avrin
Animikh Biswas
Charles Burnap
Wei Cai
Zongwu Cai
Victor V. Cifarelli
Ming Dai
Xingde Dai
Yuanan Diao
Jacek Dmochowski
Alan Dow
Yuri Godin
Mary Kim Harris
Gabor Hetyei
Evan G. Houston
Phillip Johnson
Janusz Kawczak
Mohammad A. Kazemi
Michael V. Klibanov
Alan L. Lambert
Thomas G. Lucas
Thomas R. Lucas
Stanislav Molchanov
Wanda Nabors
Hae-Soo Oh
Alex S. Papadopoulos
Joseph E. Quinn
Franz Rothe
David C. Royster
Adalira Sáenz-Ludlow
Douglas S. Shafer
Isaac M. Sonin
Nicholas M. Stavrakas
Yanqing Sun
Rajeshwari Sundaram
Boris R. Vainberg
Barnet Weinstock
Volker Wihstutz
Mingxin Xu
Alexander Yushkevich
Zhi Yi Zhang
You Lan Zhu

MASTER OF SCIENCE IN MATHEMATICS

The Master of Science Degree in Mathematics is organized into three concentrations: the concentration in General Mathematics, the concentration in Applied Mathematics, and the concentration in Applied Statistics. The concentration in General Mathematics is a robust but flexible program that allows a student to develop a broad background in Mathematics ranging over a variety of courses chosen from both pure and applied areas, or to tailor a program toward a particular focus that may not be as closely covered by our other degree concentrations, e.g. one that is interdisciplinary in nature. The concentration in Applied Mathematics develops analytical and computational skills focused toward applications of mathematics in the physical sciences as encountered in industry, government, and academia. The concentration in Applied Statistics provides theoretical understanding of, and training in, statistical methods applicable to particular areas of business, industry, government, and academia.

All candidates, regardless of which concentration is chosen, are required to take MATH 5143-5144 or STAT 5126-5127; MATH 7691 (or in the case of the General Mathematics concentration, a suitable/approved 7000 level course); and a comprehensive exam. Students may also choose a thesis option for 3-6 credit hours towards the required semester hour
total.

Concentration In General Mathematics

The Master of Science degree concentration in General Mathematics is designed both to provide advanced skills and knowledge for persons seeking either positions in industry or in government, or teaching positions at the community college level, and to provide professional development to persons currently in such positions. Graduates are also prepared to enter directly into at least the second year of a Ph.D. program in mathematics,

applied mathematics or statistics, depending on the particular course of study.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for the concentration in General Mathematics:

1) Applicants must present evidence of the satisfactory completion of at least 27 semester hours of mathematics approved by the department Graduate Committee.
2) A satisfactory score is required on at least the Quantitative portion of the Graduate Record Examination.
3) It is recommended that the student have a basic knowledge of at least two of the areas of algebra, real analysis and topology.

Concentration Requirements

The Master of Science degree concentration in General Mathematics requires successful completion of at least 30 semester hours of graduate work approved by the department Graduate Committee including: MATH 5143 and 5144 or their equivalents, at least one course each from two of the groups I, II, III, and V, and at least 15 hours in 7000-level courses. No credit shall be given for 6000-level math courses. With the approval of the department Graduate Committee, one 3-hour, non-thesis 6000-level course in computer science of a theoretical nature may be applied toward the 15 hours. Candidates for the degree concentration must demonstrate, to the satisfaction of the department Graduate Committee, competence on general knowledge in at least three of five groupings of courses listed below. This may be accomplished by (a) successful performance on a written comprehensive examination or (b) successful completion of courses in these areas.

Group I Applied Mathematics

OPRS5111	Linear Programming (3)
OPRS5112	Non-Linear Programming (3)
OPRS5113	Game Theory (3)
OPRS5114	Dynamic Programming (3)
MATH5165	Numerical Linear Algebra (3)
MATH5172	The Finite Element Method (3)
MATH5173	Ordinary Differential Equations (3)
MATH5174	Partial Differential Equations (3)
MATH5176	Numerical Methods for Partial Differential Equations (3)
MATH7172	Partial Differential Equations (3)
MATH7176	Advanced Numerical Analysis (3)
MATH7177	Applied Optimal Control (3)
MATH7178	Comp. Methods for Fluid Dynamics (3)
MATH7273	Advanced Finite Element Analysis (3)

Group II Probability-Statistics

STAT5123	Applied Statistics I (3)
STAT5124	Applied Statistics II (3)
STAT5126	Theory of Statistics I (3)
STAT5127	Theory of Statistics II (3)
STAT7027	Topics in Statistics (3)
STAT7122	Advanced Statistics I (3)
STAT7123	Advanced Statistics II (3)
STAT7127	Linear Statistical Models (3)
STAT7133	Multivariate Analysis (3)
MATH5128	Applied Probability I (3)
MATH5129	Applied Probability II (3)
MATH7120	Probability Theory I (3)
MATH7121	Probability Theory II (3)
MATH7125	Stochastic Processes (3)

Group III Algebra-Topology

MATH5163	Modern Algebra (3)
MATH5164	Abstract Linear Algebra (3)
MATH5181	Introduction to Topology (3)
MATH7163	Modern Algebra I (3)

Group IV Analysis

MATH5143	Analysis I (3)
MATH5144	Analysis II (3)
MATH7141	Complex Analysis I (3)
MATH7143	Real Analysis I (3)
MATH7144	Real Analysis II (3)

Group V Computer Science

All 5000- and 6000-level Computer Science courses.

Assistantships

A number of graduate assistantships are available each year (with nationally-competitive stipends) for qualified applicants. A limited number of fellowship awards can be applied to supplement these stipends for especially qualified students.

Thesis

Completion of a thesis is optional. With the approval of the department Graduate Committee, a candidate may receive up to six of the 15 hours required at the 7000 level for the writing of a master's thesis on an approved topic. This thesis may be original work, work of an expository nature, or the mathematical formulation and solution of a particular industrial or business problem suggested by the career interests of the student. A candidate may receive no more than six of the hours required at the 7000 level for course and thesis work in computer science. If the thesis option is elected, the candidate will be required to defend his/her thesis in an oral examination.

Comprehensive Examination

A candidate must perform satisfactorily on an oral comprehensive examination over his/her program of study.

Concentration In Applied Mathematics

The Master of Science degree concentration in Applied Mathematics is designed to develop critical thinking and intuition, and to provide advanced work in the techniques of mathematical analysis and their application to the problems of industry and technology. Skills are developed to deal with problems encountered in industry, business, and governmental work; to hold leadership positions in industry or government work; to teach Applied Mathematics at the undergraduate or community college level; and to study Applied Mathematics leading to the Ph.D. degree.

Concentration Requirements

A candidate for the Master of Science degree concentration in Applied Mathematics must complete at least 30 semester hours of graduate work approved by the department Graduate Committee to include:

Core Requirements (21 semester hours)

1) MATH5143 Analysis I (3)
   MATH5144 Analysis II (3)
   MATH5165 Numerical Linear Algebra (3)
2) One elective in Numerical Analysis selected from:
   MATH5172 The Finite Element Method (3)
   MATH5176 Numerical Methods for Partial Differential Equations (3)
3) One elective in Advanced Analysis selected from:
   MATH7141 Complex Analysis I (3)
   MATH7143 Real Analysis I (3)
   MATH7144 Real Analysis II (3)
4) Two electives in Advanced Applied Mathematics selected from:
   MATH7172 Partial Differential Equations (3)
   MATH7176 Advanced Numerical Analysis (3)
   MATH7177 Applied Optimal Control (3)
   MATH7178 Computational Methods for Fluid Dynamics (3)
   MATH7273 Adv. Finite Element Analysis. (3)

Electives (6 semester hours)

1) One advanced elective from:
   MATH7141 Complex Analysis I (3)
   MATH7143 Real Analysis I (3)
   MATH7144 Real Analysis II (3)
   MATH7172 Partial Differential Equations (3)
   MATH7176 Advanced Numerical Analysis (3)
   MATH7177 Applied Optimal Control (3)
   MATH7178 Computational Methods for Fluid Dynamics (3)
   MATH7273 Adv. Finite Element Analysis (3)
   MATH7893 Thesis (0-3)
2) One elective in Mathematics or a suitable area of application to be selected with the approval of the student's adviser. Suggested electives include:
   OPRS5113 Game Theory (3)
   STAT5123 Applied Statistics I (3)
   MEGR4111 Heat Transfer (3)
   MEGR4112 Intermediate Fluid Mechanics (3)
   MEGR6113 Adv. Conductive Heat Transfer (3)
   MEGR6141 Theory of Elasticity II (3)

Research Seminar (3 hours)
All candidates for the degree concentration must complete three hours of MATH 7691 (Research Seminar) in which they carry out an independent project under the supervision of a member of the graduate faculty. The project could involve a specific application to a concrete problem of techniques identified in the literature or studied in other courses. All projects are subject to prior approval of the department Graduate Committee and must be successfully defended before a committee of three graduate faculty members appointed by the department Graduate Committee.

Assistantships

A number of graduate assistantships are available each year (with nationally-competitive stipends) for qualified applicants. A limited number of fellowship awards can be applied to supplement these stipends for especially qualified students.

Thesis

A student may choose to expand the work begun in MATH 7691 into a master's thesis by registering for three hours of MATH 7893 to fulfill the advanced elective requirement (1) described above. This thesis option affords the student the opportunity to do professional/scholarly work demonstrating proficiency in the area of Applied Mathematics.

Comprehensive Examination

Each candidate for the degree concentration in Applied Mathematics must perform satisfactorily on a final comprehensive examination. This examination will be set and administered by a committee appointed by the department Graduate Committee. It may be either in written or oral form, and it will cover those areas of study and/or research deemed appropriate by the committee.

Concentration In Applied Statistics

The Master of Science degree concentration in Applied Statistics is designed to provide advanced skills and knowledge in the planning, design, testing, and implementation of statistical methods. Skills are developed to deal with problems encountered in statistical applications in business, industry and government; to hold administrative positions requiring planning and implementation of statistical analysis; to teach statistics at the undergraduate or community college level; and to study statistics leading to the Ph.D. degree.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for the concentration in Applied Statistics:

1) An overall GPA of at least 3.0 on all previous college work including a GPA of at least 3.0 in courses prerequisite to the area of applied statistics.
2) Evidence of undergraduate preparation in mathematics and computer science including: 12 semester hours of calculus at the level of MATH 1241/1242/2241/2242; 3 semester hours of linear algebra at the level of MATH 2164; 3 semester hours of differential equations at the level of MATH 2171; 6 semester hours of probability and statistics at the level of MATH 3122/3123; and 3 semester hours of computer programming at the level of CSCI 1100 or 1214 and its lab.

Degree Requirements

A candidate for the Master of Science degree concentration in Applied Statistics must complete a minimum of 33 semester hours of graduate work approved by the department Graduate Committee including:

Core Requirements (24 semester hours)

STAT5123	Applied Statistics I (3)
STAT5124	Applied Statistics II (3)
STAT5126	Theory of Statistics I (3)
STAT5127	Theory of Statistics II (3)
STAT7027	Topics in Statistics (3)
STAT7127	Linear Statistical Models (3)
STAT7133	Multivariate Analysis (3)
MATH7691	Research Seminar (1-3)

Electives (9 semester hours)

1) Two course selected from among:

STAT7027	Topics in Statistics (3)
MATH5128	Applied Probability I (3)
MATH5129	Applied Probability II (3)
MATH5143	Analysis I (3)
MATH5165	Numerical Linear Algebra (3)
MATH7120	Probability Theory I (3)
MATH7121	Probability Theory II (3)
MATH7143	Real Analysis I (3)
MATH7692	Research Seminar (3)
OPRS5111	Linear Programming (3)
OPRS5112	Non-linear Programming (3)
OPRS5113	Game Theory (3)
OPRS5114	Dynamic Programming (3)

2) Any MATH/STAT/OPRS course at the 7000 level.

Students who, because of their undergraduate work or other experience, can demonstrate sufficient knowledge of the material in one or more of the core courses may be exempted from taking the course or courses. Exemption from a course carries no credit towards the degree concentration.

Research Seminar and Thesis Option (3 semester hours)

All candidates for the Master of Science degree concentration in Applied Statistics are required to complete 3 hours of MATH 7691 (Research Seminar) in which they carry out an independent project under the supervision of a member of the graduate faculty. The project could involve a specific application of techniques identified in the literature or studied in other courses. All projects are subject to the prior approval of the department Graduate Committee and must be successfully defended before a committee of three graduate faculty members appointed by the department Graduate Committee.

A student may choose to expand the work begun in MATH 7691 (Research Seminar) into a Master's Thesis by registering for 3 hours of MATH 7893 (Thesis) to fulfill the elective requirement under (2) above. This thesis option affords the student the opportunity to do professional and scholarly work demonstrating proficiency in the area of applied statistics.

Assistantships

A number of graduate assistantships are available each year (with nationally-competitive stipends) for qualified applicants. A limited number of fellowship awards can be applied to supplement these stipends for especially qualified students.

Comprehensive Examination

Each candidate for the Master of Science degree concentration in Applied Statistics must perform satisfactorily on an oral comprehensive examination over the candidate's program of study.

PH.D. IN APPLIED MATHEMATICS

The Ph.D. degree program in Applied Mathematics is designed to enable its students to master a significant body of mathematics, including a specialty in applied mathematics; to relate this knowledge to a coherent area of science or engineering; and to carry on fundamental research in applied mathematics at a nationally competitive level. Recipients of this degree will, according to their abilities and choice of sub-specialty, be able to work effectively in a research and development environment involving mathematical or statistical analysis and modeling in business, government or industry; to teach mathematics at the college or university level; or to carry on fundamental research in their area of specialty.

Additional Admission Requirements

In addition to the requirements of the Graduate School for admission to doctoral study, applicants must have completed at least 27 hours of courses in the mathematical sciences at the undergraduate level, as approved by the department Graduate Committee, with grades of C or better. Admission requires that the candidate be able to take Real Analysis 8143 or be able to take MATH 5143 and have other factors in their record that indicates strong potential to complete the program. For prospective students who have done work in

mathematics beyond the bachelor's degree, performance on that work will be considered in admissions decisions. Candidates for admission must make satisfactory scores on the general portion of the Graduate Record Examination (GRE).

Students are admitted to the program by the Graduate School, based on the recommendation of the department Graduate Committee or its designate, the Graduate Coordinator. Recommendations are based on the Committee's judgment of the candidate's ability to complete the program, as supported by the application materials. The department may waive certain requirements if it judges the candidate to be nonetheless capable of completing the program. If there are more candidates than can be accommodated, candidates are admitted in order of perceived mathematical ability, promise of success, and suitability to the program.

Program of Study

The student must complete an approved program of study, including a minor, typically including approximately 54 credit hours. The minor is interdisciplinary and may be satisfied by 9 hours of graduate work outside the mathematics department, by 6 credit hours for a project in an area of application, or by a combination of external coursework and directed project in an area of application totaling 9 credit hours.

Each student will have an advisory committee appointed by the department Graduate Committee in consultation with the student and approved by the Department Chair. It includes the prospective dissertation adviser as chair (or co-chair, if the dissertation adviser is not a member of the Department of Mathematics). The advisory committee should be appointed as soon as is feasible, usually within a year after passing the Preliminary Examination. Once formed, it will have the responsibility of constructing and approving the program of study which includes the minor. Prior to the appointment of the advisory committee the student will be advised by a graduate faculty member appointed by the department Graduate Committee.

Grades

A student is expected to achieve A's or B's in all courses included in the program of study and must have at least a 3.0 GPA to graduate. The dissertation is graded on a pass/unsatisfactory basis and, therefore, will not be included in the cumulative average. An accumulation of more than two marginal (C) grades will result in suspension of the student's enrollment in the program. If a student makes a grade of U on any course, enrollment will be suspended and the student cannot take further graduate work without being readmitted to the program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the department Graduate Committee.

Transfer Credit

Only courses with grades of A or B may be accepted for transfer credit. Transfer credit must be recommended by the department Graduate Committee and approved by the Dean of the Graduate School. The amount of transfer credit cannot exceed the limit set by the Graduate School.

Preliminary Examination

The student is expected to take the preliminary examination within three semesters of being admitted to the Ph.D. program. The examination consists of two parts: a written examination based on Real Analysis I and II (8143-8144) and a written examination based on two other related courses chosen by the student and approved by the department Graduate Committee. At the discretion of the department Graduate Committee, the student may be allowed to retake a portion of the preliminary examination a second time if the student does not pass that portion on the first attempt. A student who fails the preliminary examination twice is terminated from the Ph.D. program.

Qualifying Examination and Admission to Candidacy

Each student must pass a comprehensive oral examination covering her/his chosen field of research and related advanced course work. The exam is conducted by the student's Advisory Committee and may include an additional written examination. The exam is open to the graduate faculty of the department. The student is expected to take the qualifying examination within two years of the appointment of the student's Advisory Committee. A student who fails the qualifying examination twice is terminated from the Ph.D. program. The dissertation topic may be proposed after the student has passed the qualifying examination. A doctoral student advances to candidacy after the dissertation topic has been approved by the student's advisory committee and the Dean of the Graduate School.

Assistantships

A number of graduate assistantships are available each year (with nationally-competitive stipends) for qualified applicants. A limited number of fellowship awards can be applied to supplement these stipends or provide stand-alone stipends for especially qualified students, including one award of $25,000.

Dissertation

The student must complete and defend a dissertation based on a research program approved by the student's dissertation adviser which results in a high quality, original and substantial piece of research. The student must orally present and successfully defend the dissertation before the student's Advisory Committee in a defense that is open to the public. A copy of the dissertation must be made available to the graduate faculty of the department at least two weeks prior to the public defense. The

dissertation will be graded on a pass/unsatisfactory basis by the Advisory Committee and must be approved by the Department Chair and the Dean of the Graduate School.

Residency Requirement

The full-time Ph.D. student must enroll for one continuous full-time year (i.e. two consecutive semesters of at least nine graduate credit hours in each semester) following admission to the program.

Language and Research Tool Requirements

Each student must demonstrate a reading knowledge of French, German or Russian by passing a written translation exam in one of these languages conducted by the Mathematics Department. In addition, the student must demonstrate significant computer expertise applicable to research or teaching in his or her major field as approved by the student's Advisory Committee. The computer expertise requirement may include course work or work on a project and may overlap with the minor requirement.

Time Limit for Degree Completion

The student must achieve admission to candidacy within six years after admission to the program and complete all requirements within six years after admission to candidacy for the Ph.D. degree. All requirements for the degree must be completed within eight years after first registration as a doctoral student.

MASTER OF ARTS IN MATHEMATICS EDUCATION

The Master of Arts in Mathematics Education degree program is designed primarily for secondary mathematics school teachers interested in professional growth and graduate certification in mathematics teaching. Emphasis in this program is given to developing depth and breadth in mathematics teaching and learning, appropriate to the role of the secondary school teacher.

By the end of his/her first semester in the program, each student will select a member of the Mathematics Education faculty who will serve as his/her Graduate Advisor throughout the program. Approval of the program of each student and provision of advice regarding progress toward the degree are the responsibility of the Graduate Advisor.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Mathematics Education:

1) Twenty-seven hours of undergraduate coursework in Mathematics beyond the freshman level, or evidence of equivalent academic preparation.
2) Possession of a North Carolina "A" teacher's license or the equivalent from another state. An applicant may be admitted on the condition that he/she satisfies the Class "A" requirements early in his/her course of study. Work applied to the Class "A" deficiency may not be applied toward the degree.
3) Two years of full-time experience teaching mathematics in a secondary school or other acceptable teaching experience.
4) A satisfactory score is required on the Aptitude Portion of the Graduate Record Examination.

Degree Requirements

The Master of Arts in Mathematics Education degree requires successful completion of a minimum of 36 semester hours of graduate credit or the equivalent. Of these, 18 hours must be in courses numbered 6000 or above. Programs of study beyond these 36 hours may be required to remove deficiencies in undergraduate programs or to develop areas of need, interest, or desired experience.

Core Courses

Each candidate must complete:

1) 18 hours of graduate-level Mathematics courses selected in consultation with the program Coordinator, with at least 9 hours of courses at the 6000-level. A recommended plan of study includes:
   MATH6100 Foundations of Mathematics (3)
   MATH6101 Foundations of Real Analysis (3)
   MATH6102 Calculus from an Advanced Viewpoint (3)
   MATH6106 Modern Algebra (3)
   MATH6107 Linear Algebra (3)
   MATH6118 Non-Euclidean Geometry (3)

2) 12 hours of graduate-level courses covering mathematics education learning theory, research, and contemporary topics in secondary mathematics teaching. These courses include:
   MAED6122 Theoretical Foundations of Learning Mathematics (3)
   MAED6123 Research in Mathematics Education (3)
   MAED6124 Issues in the Teaching of Secondary School Mathematics (3)
   RSCH6101 Educational Research Methods (3)

3) 6 hours of graduate-level professional education courses including:

   MDSK6260 Principles of Teacher Leadership (3)

An additional three hours of graduate-level Mathematics, Mathematics Education, or Education courses selected in consultation with the student's adviser.

4) A Basic Portfolio consisting of documents and artifacts that provides evidence of the student's professional growth during the program.

Comprehensive Exam

Upon successful completion of all coursework, each candidate for the degree in Mathematics Education must pass a comprehensive final exam consisting of two parts. The student must pass an oral exam on the mathematics content courses. The second part of the exam involves the student presenting documentation that demonstrates their professional growth as teachers and educational researchers. The student has the option of presenting either a research-based project or a comprehensive portfolio. The Graduate Advisor will advise and assist the student in planning his/her Comprehensive Portfolio or Final Research Report.

PH.D. IN CURRICULUM AND INSTRUCTION: MATHEMATICS EDUCATION SPECIALIZATION

In addition to the Masters of Arts in Mathematics Education program, the department offers a Mathematics Education specialization to students enrolled in the Ph.D. program in Curriculum and Instruction in the College of Education. Students choosing a specialization in Mathematics Education must complete 24 hours of 8000-level coursework in mathematics education courses. All students must complete MAED 8160 Readings in Mathematics Education. The remaining courses and seminars are to be chosen by the student, advisor, and graduate committee to expand his/her knowledge base and leadership skills relative to issues, problems, and solutions in urban-regional education.

Required (3):

EDCI8160 Readings in Mathematics Education. (3)

Additional MAED 8000-level courses (21):

EDCI8004 Topics in Analysis. (3)
EDCI8008 Topics in Geometry and Topology. (3)
EDCI8100 Foundations of Mathematics. (3)
EDCI8101 Foundations of Real Analysis. (3)
EDCI8102 Calculus from an Advanced Viewpoint. (3)
EDCI8103 Computer Techniques and Numerical Methods. (3)
EDCI8105 Problem Solving in Discrete Mathematics. (3)
EDCI8106 Modern Algebra. (3)
EDCI8107 Linear Algebra. (3)
EDCI8118 Non-Euclidean Geometry. (3)
EDCI8609 Seminar. (3)
EDCI8122 Theoretical Foundations of Learning Mathematics. (3)
EDCI8123 Research in Mathematics Education. (3)
EDCI8124 Advanced Topics in Mathematics Education. (3)
EDCI8125 Issues in the Teaching of Secondary School Mathematics. (3)
EDCI8160 Readings in Mathematics Education. (3)

Courses In Mathematics, Mathematics Education And Statistics

Mathematics

MATH 5000. Topics in Foundations or History of Mathematics. (2-3) Prerequisite: consent of the department. Topics in the foundations or the history of mathematics selected to supplement regular course offerings in this area of mathematics. May be repeated for credit with approval of the department. Credit for the M.A. degree in mathematics requires approval of the department. *(On demand)*

MATH 5040. Topics in Analysis. (2-3) Prerequisite: consent of the department. Topics in the foundations or the history of mathematics selected to supplement regular course offerings in this area of mathematics. May be repeated for credit with the approval of the department. Credit for the M.A. degree in mathematics requires approval of the department. *(On demand)*

MATH 5060. Topics in Algebra. (2-3) Prerequisite: consent of the department. Topics in algebra selected to supplement regular course offerings in this area of mathematics. May be repeated for credit with the approval of the department. Credit for the M.A. degree in mathematics requires approval of the department. *(On demand)*

MATH 5080. Topics in Geometry and Topology. (3) Prerequisite: consent of the department. Topics in geometry or topology selected as to supplement regular course offerings in this area of mathematics. May be repeated for credit with approval of the department. Credit for M.A. degree in mathematics requires approval of the department. *(On demand)*

MATH 5109. History of Mathematical Thought. (3) Prerequisite: MATH 1241 or consent of the department. A study of the development of mathematics in its historical setting from the earliest beginnings to modern times. Not approved for the M.A. in mathematics degree. *(Fall) (Evenings)*

MATH 5128. Applied Probability I. (3) Prerequisite: MATH/STAT 3122 and MATH 2171 or consent of the department. Finite and countable Markov chains, Markov Decision Processes, and optimal stopping. Other topics selected from: queuing theory, inventory models, reliability theory, game theory, recurrent events, information theory, stochastic control, stochastic control with incomplete information and Kalman filtering. *(Fall)(Alternate years)*

MATH 5129. Applied Probability II. (3) Prerequisite: MATH 5128 or consent of the department. Continuation of MATH 5128. *(Spring)(Alternate years)*

MATH 5143. Analysis I. (3) Prerequisite: MATH 3141 with a grade of B or better, or consent of the department. First course of a two-semester sequence providing a rigorous treatment of continuity, differentiability and integration of functions of one and several real variables. *(Fall)*

MATH 5144. Analysis II. (3) Prerequisite: MATH 5143 with a grade of B or better or consent of the department. Continuation of MATH 5143. *(Spring)*

MATH 5161. Number Theory. (3) Prerequisite: MATH 3163 with a grade of C or better or consent of the department. A study of the elements of classical number theory including divisibility, congruences, diophantine equations, prime numbers and their distribution, quadratic reciprocity, number-theoretic functions, and famous unsolved problems. Not approved for the M.A. in mathematics degree. *(Spring) (Alternate years)*

MATH 5163. Modern Algebra. (3) Prerequisite: MATH 3163 or consent of the department. Groups, rings, integral domains, fields. *(Fall) (Alternate years)*

MATH 5164. Abstract Linear Algebra. (3) Prerequisite: MATH 3163 and 2164 or consent of the department. Vector spaces over arbitrary fields, linear transformations, canonical forms, multilinear algebra. *(Spring) (Alternate years)*

MATH 5165. Numerical Linear Algebra. (3) Prerequisites: CSCI 1100 or 1201 and 1201L, MATH 2164 and 2171, all with a grade of C or better, or consent of the Department. Gaussian elimination and LU decomposition methods for linear systems. Vector and matrix norms, condition numbers and accuracy of solutions. Solutions of large sparse matrix systems using skyline solvers, and Jacobi, Gauss-Seidel, and SOR iterative methods. Solution of nonlinear systems. Least squares methods using the QR factorization. Selected problems will be programmed for computer solution. *(Fall) (Alternate years)*

MATH 5171. Numerical Solution of Ordinary Differential Equations. (3) Prerequisites: CSCI 1100 or 1201 and 1201L, MATH 2241, 2164, and 2171, all with a grade of C or better, or consent of the Department. Numerical solution techniques for ordinary differential equations such as Runga-kutta, multistep and extrapolation methods. Stiff solvers and stability criteria. Comparative work with modern robust codes and visualization methods. *(On demand)*

MATH 5172. The Finite Element Method. (3) Prerequisites: CSCI 1100 or 1201 and 1201L, MATH 2241, 2164, and 2171, all with a grade of C or better, or consent of the department. Boundary value problems and their variational form. Finite element basis functions, computational techniques, isoparametric elements and curved boundaries, alternate methods, singular problems, eigenvalue problems. Some practical experience with an F.E.M. program and graphical output. *(Spring) (Alternate years)*

MATH 5173. Ordinary Differential Equations. (3) Prerequisites: MATH 2171 and MATH 3142, or consent of the department. Existence and uniqueness theorems for initial value problems; continuous dependence of solutions on initial values and right hand sides; linear differential equations in R2 and Rn; non-linear differential equations in R2 and Rn: phase portraits, singularities, cycles; invariant manifolds; linearization; singularities of planar systems; Lyapunov stability; examples: van der Pol oscillator, Liénard systems, Volterra-Lotka equations. *(Spring)*

MATH 5174. Partial Differential Equations. (3) Prerequisites: MATH 2164 and MATH 3141, or consent of department. Classification of types of partial differential equations. Separation of variables, Sturm-Liouville problems, boundary and eigenvalue problems, fundamental solutions and Green's theorem, Fourier series and integrals, Laplace transforms. *(Fall)*

MATH 5176. Numerical Methods for Partial Differential Equations. (3) Prerequisite: CSCI 1100 or 1201 and 1201L, MATH 2241, 2164, and 2171 all with a grade of C or better, or consent of the department. Basic finite difference schemes for the solutions of elliptic, parabolic and hyperbolic equations. Van Neuman analysis, characteristics, boundary conditions. *(Fall) (Alternate years)*

MATH 5181. Introduction to Topology. (3) Prerequisite: MATH 2164 with a grade of C or better. Topics from set theory and point set topology such as cardinality, order, topological spaces, metric spaces, separation axioms, compactness and connectedness. *(Fall) (Alternate years)*

MATH 5691. Seminar. (1-6) Prerequisite: consent of the department. Individual or group investigation and exposition of selected topics in mathematics. *(On demand)*

MATH 5692. Seminar. (1-6) Prerequisite: consent of the department. A continuation of MATH 5691. *(On demand)*

MATH 6004. Topics in Analysis. (3) Prerequisite: MATH 6101 or consent of department. Topics in analysis selected so as to complement regular course offerings in this area of mathematics. May be repeated for credit with the consent of department. *(On demand)*

MATH 6008. Topics in Geometry and Topology. (3) Prerequisite: consent of department. Topics selected from

Euclidean geometry, non-Euclidean geometry, projective geometry, differential geometry, point-set topology, algebraic topology. May be repeated for credit with approval of department. *(On demand)*

MATH 6050. Topics in Mathematics. (3) Prerequisite: consent of the department. Topics chosen from applied mathematics applicable to other disciplines.

MATH 6100. Foundations of Mathematics. (3) Prerequisite: consent of department. Logic, sets and axiomatic systems. *(Fall, Summer) (Alternate years)*

MATH 6101. Foundations of Real Analysis. (3) Prerequisite: MATH 6100 or consent of department. Axiomatic and historical development of the real and complex numbers; rigorous development of limits and continuity of functions, intermediate and extreme value theorems. *(Fall) (Alternate years)*

MATH 6102. Calculus from an Advanced Viewpoint. (3) Prerequisite: MATH 6101 or its equivalent. A continuation of MATH 6101. A rigorous approach to differentiation and integration of functions of one real variable. *(Spring) (Alternate years)*

MATH 6103. Computer Techniques and Numerical Methods. (3) Prerequisite: MATH 6101 or consent of department. Computer systems, programming, and the computer solution of numerical problems. *(Summer) (Alternate years)*

MATH 6105. Problem Solving in Discrete Mathematics. (3) Prerequisite: consent of department. Propositional and predicate calculus, counting techniques, partially ordered sets, lattices, graphs and trees. *(Alternate years)*

MATH 6106. Modern Algebra. (3) Prerequisite: MATH 3163 or its equivalent or consent of department. Topics chosen from group theory, rings and ideals, integral domains, fields and elementary Galois theory. *(Summer) (Alternate years)*

MATH 6107. Linear Algebra. (3) Prerequisite: MATH 2164 or its equivalent or consent of department. Systems of linear equations, matrices, vector spaces, linear transformations, determinants, canonical forms of matrices, inner products. *(Summer) (Alternate years)*

MATH 6118. Non-Euclidean Geometry. (3) Prerequisite: consent of department. History of Euclid's Fifth Postulate and attempts to prove it; work of Gauss, Bolyai, Lobachevsky and others; systematic development of hyperbolic geometry; relative consistency of hyperbolic geometry; relative consistency of hyperbolic and Euclidean geometries. *(Alternate years)*

MATH 6171. Advanced Applied Mathematics I. (3) Prerequisites: MATH 2241 and 2171 with grades of C or better, or consent of department. Power series solutions of ordinary differential equations, vector calculus, line and surface integrals, partial differential equations and Fourier integrals. *(Fall) (Evenings)*

MATH 6172. Advanced Applied Mathematics II. (3) Prerequisites: MATH 2241 and 2171 with grades of C or better or consent of department. Complex analysis; probability and statistics. *(Spring) (Evenings)*

MATH 6201. Statistical Techniques in Finance. (3) This course reviews basic concepts and introduces more advanced techniques from Probability and Statistics which are commonly utilized in mathematical finance. Topics covered include random variables, distributions, conditional expectations, confidence intervals and hypothesis testing, simple and multiple regression, multivariate analysis including factor and canonical correlation analysis, and time series models including ARMA, ARIMA, ARCH, and GARCH.

MATH 6202. Derivatives II: Partial Differential Equations for Finance. (3) This course deals with those partial differential equations which are associated with financial derivatives based on factors such as equities and spot interest rates.

MATH 6203. Stochastic Calculus for Finance. (3) An introduction to those aspects of partial differential equations and diffusion processes most relevant to finance, Random walk and first-step analysis, Markov property, martingales and semi-martingales, Brownian motion. Stochastic differential equations: Ito's lemma, backward and forward Kolmogorov equations, the Feynman-Kac formula, stopping times, Hull and White Models, Cox-Ingersoll-Ross Model. Applications to finance including portfolio optimization and option pricing.

MATH 6204. Numerical Methods for Financial Derivatives. (3) This course will introduce students to numerical and computational techniques for solving both European- and American-style financial derivatives. The approach will be the finite difference method and the basic theoretical concepts will be introduced. Final projects will involve implementing the techniques on computers. Some spectral and Monte Carlo methods will also be discussed.

MATH 6205. Financial Computing. (3) This lab oriented course introduces the numerical methods needed for quantitative work in finance, focusing on derivative pricing and fixed income applications. Topics include binomial and trinomial methods, Crank-Nicholson methods for various exotic options, treatment of discrete dividends, numerical methods for stochastic differential equations, random number generators, Monte-Carlo methods for European and American options. The computing class teaches theory and practice of numerical finance as well as the programming skills needed to build

software systems in C/C++, Java, Javascript, and Mathematica/Matlab.

MATH 6609. Seminar. (1-3) Prerequisite: consent of the department. A series of regularly scheduled meetings in which each student will present one or more topics selected by the instructor. May be repeated for credit with the consent of department. *(On demand)*

MATH 7028. Topics in Probability. (3) Prerequisite: MATH 7120 and 7121, or consent of department. Topics of current interest in probability and advanced topics in probability. May be repeated for credit with the consent of the department. *(On demand)*

MATH 7050. Topics in Mathematics. (2-3) Prerequisite: consent of department. Topics chosen from such fields as algebra, topology, analysis, applied mathematics, differential geometry, mathematical physics, graph theory, probability, statistics. May be repeated for credit as topics vary and with the approval of the department. *(On demand)*

MATH 7065. Topics in Applied Algebra and Algebraic Structures. (3) Prerequisite: consent of the department. Current topics in Applied Algebra and Algebraic Structure. *(On demand)*

MATH 7070. Topics in Numerical Analysis. (3) Prerequisite: consent of the department. Topics of current interest in numerical analysis. May be repeated for credit with the consent of the department. *(On demand)*

MATH 7071. Topics in Differential Equations. (3) Prerequisite: consent of the department. Topics of current interest in ODE, PDE, dynamical systems, inverse problems and related subjects. May be repeated for credit with the consent of the department. *(On demand)*

MATH 7120. Probability Theory I. (3) Prerequisites: MATH 7143 and MATH/STAT 3122 or consent of department. Topics include probability spaces, probability measures, sigma-algebras, characteristic functions, sequences of random variables, law of large numbers, general forms of the Central Limit Theorem. *(Fall) (Alternate years)*

MATH 7121. Probability Theory II. (3) Prerequisite: MATH 7120 or consent of the department. A continuation of MATH 7120. *(Spring) (Alternate years)*

MATH 7125. Stochastic Processes I. (3) Prerequisites: MATH 3122 and 7143 or consent of the department. Basic ideas in the study of stochastic processes, selected from: discrete and continuous time Markov processes, stationary and renewal processes, applications to queuing theory, reliability theory, stochastic differential equations, time-series analysis, filtering and stochastic control theory. *(On demand)*

MATH 7126. Stochastic Processes II. (3) Prerequisite: MATH 7125. A continuation of MATH 7125. *(On demand)*

MATH 7141. Complex Analysis I. (3) Prerequisite: MATH 5143 or consent of the department. Holomorphic functions, complex integration, residues, entire and meromorphic functions, conformal mapping, harmonic functions. *(Spring) (Alternate years)*

MATH 7142. Complex Analysis II. (3) Prerequisite: MATH 7141. A continuation of MATH 7141. *(On demand)*

MATH 7143. Real Analysis I. (3) Prerequisite: MATH 5144 or consent of the department. Lebesgue integration on the real line, Lp spaces, introduction to general measure and integration theory. *(Fall)*

MATH 7144. Real Analysis II. (3) Prerequisite: MATH 7143 or consent of the department. A continuation of MATH 7143. *(Spring)*

MATH 7147. Applied Functional Analysis. (3) Prerequisite: MATH 5144. Introduction to functional analysis and its applications to such areas as linear and non-linear differential equations, integral equations, and control theory. Topics chosen from Banach spaces, operators, the Hahn-Banach, open mapping and closed graph theorems, Sobolev spaces, spectral theory, operators in Hilbert space. *(Summer) (On Demand)*

MATH 7148. Functional Analysis. (3) Prerequisite: MATH 7144 or consent of the department. Material selected from: spectral theory, spectral theory of differential operators, groups and semigroups of operators, nonlinear functional analysis, asymptotic analysis, integral equations, Fourier analysis, distributions, and Sobolev spaces. *(Fall)(Alternate years)*

MATH 7163. Modern Algebra I. (3) Prerequisite: MATH 4163 and 4164 or consent of department. Topics will be selected from Galois theory, commutative algebra, modules, ring theory, homological algebra. *(Fall) (Alternate years)*

MATH 7164. Modern Algebra II. (3) Prerequisite: MATH 7163. A continuation of MATH 7163. *(On demand)*

MATH 7172. Partial Differential Equations. (3) Prerequisite: MATH 5174 and 7144 or consent of department. Harmonic functions, mean-value theorem, maximum principle, Green's representation for the solution of the Dirichlet problem for Laplace's equation; Poisson's equations and the Poisson formula; statement and proof of the existence theorem for general second-order elliptic operators, generalized maximum principles; Sobolev spaces. Evolution equations involving elliptic

operators, such as the heat or wave equations, may also be introduced. *(Spring) (Alternate years)*

MATH 7173. Evolution Equations. (3) Prerequisite: MATH 7144 and 7172 or consent of the department. Semigroups of operators and their generators, examples of semigroups. The heat equation, examples of elliptic operators that generate semigroups, Hille-Yosida theory, analytic semigroups; examples, fractional powers of operators. *(On demand)*

MATH 7174. Linear and Non-linear Waves. (3) Prerequisite: MATH 5124 and 7144 or consent of the department. Hyperbolic waves, characteristics, Riemann invariants, conservation laws, weak solutions, shock structure. Burger's equation, gas dynamics, dispersive waves, group velocity, water waves, non-linear optics. *(On demand)*

MATH 7175. Inverse Problems. (3) Prerequisite: MATH 7144 and MATH 5174 or consent of the department. Ill-posed problems and numerical methods for them. Applications of inverse problems to real processes. One dimensional inverse problems. Multi-dimensional inverse problems: uniqueness and numerical methods. Inverse scattering problems. *(On demand)*

MATH 7176. Advanced Numerical Analysis. (3) Prerequisites: MATH 2164, 2171 and 5176 or consent of the department. A selection of topics from such areas as iterative methods of solving linear and non-linear systems of equations, approximation theory, splines, and finite element methods for partial differential equations. *(Spring) (Alternate years)*

MATH 7177. Applied Optimal Control. (3) Prerequisites: MATH 5143 or consent of the department. Examples of control systems and optimization problems, optimal control of discrete-time systems, solutions of the general discrete-time optimization problem, optimal control of continuous-time systems, the calculus of variations, solution of the general continuous optimization problem, applications of the Pontryagin Maximum Principle, Dynamic programming, and Bang-bang control. Controllability and differential games may also be introduced. *(Spring) (Alternate years)*

MATH 7178. Computational Methods for Fluid Dynamics. (3) Prerequisite: CSCI 1100 or 1201 and 1201L, MATH 2242, 2171, 5174 and 5176 or consent of the department. Topics on various numerical techniques for the solution of incompressible and compressible flows. Finite difference, finite element and spectral methods, and shock capturing and fitting methods. Multi-grid method and acceleration techniques. *(On demand)*

MATH 7179. Advanced Finite Difference Methods. (3) Prerequisite: consent of the department. Accuracy analysis and design of high order schemes, stability theory of schemes with variable coefficients, stability theory of schemes for initial-boundary value problems, convergence theory for nonlinear cases. *(On demand)*

MATH 7181. Topology I. (3) Prerequisite: consent of department. Topological spaces, continuous functions, connectedness, compactness, and metrizability, and further topics from point-set, geometric or algebraic topology. *(On demand)*

MATH 7182. Topology II. (3) Prerequisite: MATH 7181. A continuation of MATH 7181. *(On demand)*

MATH 7184. Differential Geometry I. (3) Prerequisite: consent of the department. Manifolds, differential structures, tangent bundles, embeddings, immersions, inverse function theorem, Morse-Sard theorem, transversality, Borsuk-Ulam theorem, vector bundles, Euler characteristics, Morse theory, Stokes theorem, Gauss-Bonnet theorem, Whitney embedding theorem. *(On demand)*

MATH 7185. Differential Geometry II. (3) Prerequisite: consent of the department. Differentiable manifolds, differential forms, critical points, local and global theory of curves, local and global theory of surfaces, connections, geodesics, curvature, spaces of constant curvature, Lie groups and Lie algebras. *(On demand)*

MATH 7273. Advanced Finite Element Analysis. (3) Prerequisite: MATH 5172 and 5174 or consent of the department. Selection of topics from such areas of finite element analysis as convergence theorems (Ciarlet), hierarchical basis functions, the h-p method, adaptive grid techniques and solution methods for nonlinear equations. *(Fall)(Alternate years)*

MATH 7275. Dynamical Systems I. (3) Prerequisites: MATH 5143 and MATH 5173 or consent of the department. Cycles and separatrix cycles, Poincaré first-return map: diffeomorphisms, Poincaré-Bendixson Theory, flows on the two-torus; structural stability, genericity, Peixoto's theorem; singularities of planar systems. Degenerate singularities, Hopf bifurcation, saddle-node bifurcation, center bifurcation. *(On demand)*

MATH 7276. Dynamical Systems II. (3) Prerequisite: MATH 7275 or consent of the department. Method of averaging, Melnikov functions, hyperbolic structure, symbolic dynamics, homoclinic and heteroclinic orbits, global bifurcations, infinite dimensional dynamical systems, inertial manifolds, Lyapunov exponents and dimension of attractors, codimension-two bifurcations, Duffing's equation, Lorenz equations, finite dimensional systems of dimension at least three. *(On demand)*

MATH 7277. Bifurcation Theory. (3) Prerequisite: MATH 7275 or consent of the department. Implicit function theorem, manifolds and transversality, Newton polygons, Lyapunov center theorem, variational methods,

Ljusternik-Schnirelman theory, mountain-pass theorem, bifurcations with one-dimensional null-spaces, Morse theory and global bifurcations, geometric theory of partial differential equations. *(On demand)*

MATH 7691. Research Seminar. (1-3) Prerequisite: consent of department. A seminar in which independent study may be pursued by the student or a group of students under the direction of a professor. *(On demand)*

MATH 7692. Research Seminar. (1-3) Prerequisite: consent of department. A continuation of MATH 7691. *(On demand)*

MATH 7893. Thesis. (0-3) Prerequisite: consent of department. Subject to the approval of the department Graduate Committee, the thesis may be original work, work of an expository nature, or the mathematical formulation and solution of a particular industrial or business problem suggested by the career interests of the student. The thesis must be defended in an oral presentation. May be repeated for credit with the consent of department. *(Fall, Spring, Summer)*

MATH 7999. Master Residency Credit. (1) *(Fall, Spring, Summer)*

MATH 8028. Topics in Probability. (3) See MATH 7028 for Course Description.

MATH 8050. Topics in Mathematics. (2-3) See MATH 7071 for Course Description.

MATH 8065. Topics in Applied Algebra and Algebraic Structures. (3) See MATH 7065 for Course Description.

MATH 8070. Topics in Numerical Analysis. (3) See MATH 7070 for Course Description.

MATH 8071. Topics in Differential Equations. (3) See MATH 7071 for Course Description.

MATH 8120. Probability Theory I. (3) See MATH 7120 for Course Description.

MATH 8121. Probability Theory II. (3) See MATH 7121 for Course Description.

MATH 8125. Stochastic Processes I. (3) See MATH 7125 for Course Description.

MATH 8126. Stochastic Processes II. (3) See MATH 7126 for Course Description.

MATH 8141. Complex Analysis I. (3) See MATH 7141 for Course Description.

MATH 8142. Complex Analysis II. (3) See MATH 7142 for Course Description.

MATH 8143. Real Analysis I. (3) See MATH 7143 for Course Description.

MATH 8144. Real Analysis II. (3) See MATH 7147 for Course Description.

MATH 8147. Applied Functional Analysis. (3) See MATH 7147 for Course Description.

MATH 8148. Functional Analysis. (3) See MATH 7148 for Course Description.

MATH 8163. Modern Algebra I. (3) See MATH 7163 for Course Description.

MATH 8164. Modern Algebra II. (3) See MATH 7164 for Course Description.

MATH 8172. Partial Differential Equations. (3) See MATH 7172 for Course Description.

MATH 8173. Evolution Equations. (3) See MATH 7173 for Course Description.

MATH 8174. Linear and Non-linear Waves. (3) See MATH 7174 for Course Description.

MATH 8175. Inverse Problems. (3) See MATH 7175 for Course Description.

MATH 8176. Advanced Numerical Analysis. (3) See MATH 7176 for Course Description.

MATH 8177. Applied Optimal Control. (3) See MATH 7177 for Course Description.

MATH 8178. Computational Methods for Fluid Dynamics. (3) See MATH 7178 for Course Description.

MATH 8181. Topology I. (3) See MATH 7181 for Course Description.

MATH 8182. Topology II. (3) See MATH 7182 for Course Description.

MATH 8184. Differential Geometry I. (3) See MATH 7184 for Course Description.

MATH 8185. Differential Geometry II. (3) See MATH 7185 for Course Description.

MATH 8273. Advanced Finite Element Analysis. (3) See MATH 7273 for Course Description.

MATH 8275. Dynamical Systems I. (3) See MATH 7276 for Course Description.

MATH 8276. Dynamical Systems II. (3) See MATH 7276 for Course Description.

MATH 8277. Bifurcation Theory. (3) See MATH 7277 for Course Description.

MATH 8691. Research Seminar. (1-3) See MATH 7691 for Course Description.

MATH 8692. Research Seminar. (1-3) See MATH 7692 for Course Description.

MATH 8994. Doctoral Research and Reading. (0-9) Prerequisite: consent of the department. May be repeated with consent of the department. *(On demand)*

Math 9999. Doctoral Residency Credit. (1) (Fall, Spring, Summer)

Mathematics Education

MAED 5000. Topics in Mathematics Education, Early Childhood. (1-6) Prerequisite: consent of department. *(On demand)*

MAED 5040. Topics in Mathematics Education, Intermediate. (1-6) Prerequisite: consent of department. *(On demand)*

MAED 5070. Topics in Mathematics Education, Secondary. (1-6) Prerequisite: consent of department. *(On demand)*

MAED 5101. Arithmetic in the School. (3) Prerequisite: MATH 1100 or equivalent. A study of the number systems with emphasis placed upon the basic concepts and meanings, properties of addition, multiplication, inverses, systems of numeration and number line appropriate for each grade. (Does not count toward a major in mathematics. Open only to transfer students who have completed six semester hours of mathematics at another university.) *(On demand)*

MAED 5104. Microcomputing for Teachers. (3) Prerequisites: working knowledge of college algebra and trigonometry, and consent of department. Introduction to basic computer concepts, to microcomputer systems, to the design and development of programs to assist instruction in mathematics and computer sciences. A programming language such as BASIC or LOGO will be used. Each student will integrate skills learned by selecting, designing and developing a specific project. (No prior experience with computer programming required.) *(Spring) (Evenings)*

MAED 5105. Geometry for Teachers. (3) Prerequisite: MATH 2102 or MAED 5101 or consent of department. A study of the foundations of Euclidean geometry and a brief treatment of non-Euclidean geometry. Emphasis on learning activities and teaching techniques for teachers of mathematics K-12. *(Spring) (Evenings)*

MAED 5141. Mathematics for the Intermediate School Teacher. (3) Prerequisite: MATH 2102 or consent of department. A study of the algebraic properties of the real numbers; functions, equations, inequalities and their graphs, activities and applications related to upper elementary and intermediate grades. *(Fall) (Evenings)*

MAED 6122. Theoretical Foundations of Learning Mathematics. (3) Prerequisites: Students must be enrolled in the Masters of Arts in Mathematics Education Program. Introductions to theories of learning that have influenced the teaching of mathematics in K-12. An overview of theories that have guided reforms in mathematics teaching; contemporary constructivist theories of mathematics learning. *(Alternate years)*

MAED 6123. Research in Mathematics Education. (3) Prerequisites: Students must be enrolled in the Masters of Arts in Mathematics Education Program. An introduction and overview of research in the teaching and learning of mathematics in K-12. Overview of contemporary research perspectives and paradigms; interpreting and synthesizing the research literature; survey of contemporary research problems in mathematics teaching and learning; development of classroom-based research studies. *(Alternate years)*

MAED 6124. Issues in the Teaching of Secondary School Mathematics. (3) Prerequisites: Students must be enrolled in the Masters of Arts in Mathematics Education Program. Study of major issues affecting secondary mathematics education: analysis of the impact of learning theories on methods of teaching; assessment methods for improving mathematics learning; analysis of the historical and programmatic development of the secondary school mathematics curriculum leading to current trends, issues, and problems; and analysis of the role of technology in the secondary mathematics classroom. *(Alternate years)*

MAED 8124. Advanced Topics in Mathematics Education. (3) Prerequisites: Enrollment in the Mathematics Education specialization of the Doctoral Program in Curriculum and Instruction. Advanced research topics in the teaching and learning of mathematics. Includes a survey, interpretation, and synthesis of contemporary research problems in mathematics teaching and learning. Can be repeated for credit. *(On demand)*

MAED 8160. Readings in Mathematics Education. (3) Prerequisites: Enrollment in the Mathematics Education specialization of the Doctoral Program in Curriculum and Instruction. Readings in the teaching and learning of mathematics K-16; analysis of the historical development of the K-16 mathematics curriculum leading to current trends, issues, and problems; theory, methods, and techniques for assessment; and analysis of

contemporary issues impacting the teaching of mathematics. (*On demand*)

Statistics

STAT 5123. Applied Statistics I. (3) Prerequisites: MATH 2164 with a grade of C or better and junior standing, or consent of department. Review of stochastic variables and probability distributions, methods of estimating a parameter, hypothesis testing, confidence intervals, contingency tables. Linear and multiple regression, time series analysis. *(Fall) (Evenings) (Alternate years)*

STAT 5124. Applied Statistics II. (3) Prerequisite: STAT 5123 or consent of the department. Single factor analysis of variance. Multi-factor analysis of variance. Randomized complete-block designs, nested or hierarchical designs, Latin squares, factorial experiments. Design of experiments. *(Spring) (Evenings) (Alternate years)*

STAT 5126. Theory of Statistics I. (3) Prerequisite: STAT 3123 or consent of the department. Survey of the mathematical structure supporting applied statistics. Discrete and continuous distributions, moment-generating functions, sampling, point estimation, the multivariate normal distribution, sampling distributions. *(Fall) (Alternate years)*

STAT 5127. Theory of Statistics II. (3) Prerequisite: STAT 5126 or consent of the department. Point and interval estimations, hypothesis testing, regression and linear hypotheses, experimental designs and analysis, distribution-free methods. *(Spring) (Alternate years)*

STAT 6027. Topics in Statistics. (3) Prerequisite: consent of the department. Topics chosen from applied statistics applicable to other disciplines.

STAT 7027. Topics in Statistics. (3) Prerequisite: consent of the department. Topics of current interest in statistics and/or applied statistics. May be repeated for credit with consent of the department. *(On demand)*

STAT 7122. Advanced Statistics I. (3) Prerequisite: MATH 7143 and STAT 5127 or consent of department. A survey of frequently used statistical techniques selected from: estimation theory and hypothesis testing, parametric goodness-of-fit criterion and tests for independence, measures of association, regression techniques, multi-sample inferential techniques, Bayes and minimax estimation, admissibility, minimax property. *(On demand)*

STAT 7123. Advanced Statistics II. (3) Prerequisites: STAT 7122 or consent of the department. Hypothesis testing, Neyman-Pearson Lemma, UMP tests, UMP unbiased tests, monotone likelihood ratio families of distributions, UMP invariant tests. Confidence bounds and regions, uniformly most accurate bounds, regression models, least squares estimates, normal equations, Gauss-Markov theorem. Large sample behavior of methods of moments estimates, maximum likelihood estimates, likelihood ratio tests, Chi-square tests, approximate confidence regions for large samples. *(On demand)*

STAT 7124. Sampling Theory. (3) Prerequisite: STAT 5126 or consent of the department. Methods and theory of survey sampling: simple, systematic, stratified, cluster multistage and specialized sampling schemes and the problems of their implementation and analysis. *(On demand)*

STAT 7127. Linear Statistical Models. (3) Prerequisites: MATH 2164 and 3123 or consent of the department. A selection of topics from the following list: distribution and quadratic forms, regression, dummy variables, models not of full rank, the two-way crossed classification, time series. *(Fall) (Alternate years)*

STAT 7133. Multivariate Analysis. (3) Prerequisite: STAT 5126 and 5127 or consent of the department. Multivariate distributions. Inference for the multivariate normal model. Further topics from the following: principal components, factor analysis, multidimensional scaling, canonical correlation, discriminant analysis, cluster analysis, multivariate linear models, special topics. *(Fall) (Alternate years)*

STAT 8027. Topics in Statistics. (3) See STAT 7027 for Course Description.

STAT 8122. Advanced Statistics I. (3) See STAT 7122 for Course Description.

STAT 8123. Advanced Statistics II. (3) See STAT 7123 for Course Description.

STAT 8124. Sampling Theory. (3) See STAT 7124 for Course Description.

STAT 8127. Linear Statistical Models. (3) See STAT 7127 for Course Description.

STAT 8133. Multivariate Analysis. (3) See STAT 7133 for Course Description.

OPERATIONS RESEARCH

Department of Mathematics

376 Fretwell Building
(704) 687-4929

Degree

Interdisciplinary Graduate Minor

GRADUATE MINOR IN OPERATIONS RESEARCH

The interdisciplinary graduate minor in Operations Research is designed to provide advanced problem solving skills and knowledge in the general areas of operations research and optimization to enable their application to effectively address the present day problems of business, management science, engineering and computer science. This program can serve as an effective and focused supplement to existing graduate programs in the participating departments. The required courses are offered by the participating departments of Electrical Engineering, Civil Engineering, Computer Science, Mechanical Engineering, Economics, and Information & Operations Management.

Admission Requirements

Students admitted to graduate degree programs in the participating departments and the M.B.A. program who are in good standing, are eligible for the minor in Operations Research.

Requirements for the Minor

1) Declaration of the minor, preferably by the end of the first semester of graduate study.
2) Formation of a Program Committee: Students who elect to minor in Operations Research will select a participating faculty member as a member of their regular graduate committee. A list of participating faculty will be available from the coordinator of the minor in Operations Research.
3) Fulfill the requirements of a participative degree program and complete OPRS 6101/8101 and one course each from two of the following areas selected with the advice and knowledge of the student's program committee.

Mathematics: OPRS 5111, 5112, 5113, 5114 MATH 5165, 7125, 7177 and topics: reliability theory, queuing models, variational methods.
Computer Science: ITCS 6160, 6166
Management Information Systems and Operations Management: MBAD 6121, 6122, 6141
Economics: ECON 6100, 6112
Electrical Engineering: EEGR 6111, 6112, 6115, 6116
Civil Engineering: CEGR 5090, 6181

Students must have a cumulative 3.0 GPA in courses applied to the minor. Course waivers and transfer credit will be considered on an individual basis.

Courses in Operations Research

OPRS 5010. Topics in Decision Mathematics. (2-3) Prerequisite: consent of the department. Topics in decision mathematics selected to supplement regular course offerings in this area of mathematics. May be repeated for additional credit with the approval of the department. Credit for the M.A. degree in mathematics requires approval of the department. *(On demand)*

OPRS 5111. Linear Programming. (3) Prerequisite: OPRS 3111 and CSCI 1100 or 1201 and 1201L. Mathematical formulation and solution of linear programming problems. Topics include: the simplex method and its variations, sensitivity and parametric analysis, duality, and applications. A project will be required for all graduate students. *(On demand)*

OPRS 5112. Non-Linear Programming. (3) Prerequisites: CSCI 1100 or 1201 and 1201L, OPRS 3111 and MATH 2241. Basic unconstrained optimization problems, search techniques, some discussion of rates of convergence and an introduction to constrained optimization. Computer implementation and testing of optimization algorithms will be required. A project will be required of all graduate students. *(On demand)*

OPRS 5113. Game Theory. (3) Prerequisites: OPRS 3111 and one of STAT 2122, MATH/STAT 3122, or OPRS 3113. The theory of zero-sum matrix games, minimax theorem, optimal strategies, symmetric games, economic models, infinite, separable, polynomial, multistage, general-sum and n-person games. A project will be required of all graduate students. *(On demand)*

OPRS 5114. Dynamic Programming. (3) Prerequisites: CSCI 1100 or 1201 and its lab, OPRS 3111, and one of STAT 2122, MATH/STAT 3122 or OPRS 3113. The identification of dynamic programming problems and their solution in terms of recurrence relations. Elementary path problems, resource allocation, shortest path, traveling salesmen problem, discrete-time optimal control, replacement models and inventory systems. A project will be required of all graduate students. *(On demand)*

OPRS 6101. Introduction to Operations Research. (3) Prerequisite: STAT 3122. Operations Research approach: modeling, constraints, objective and criterion. The problem of multiple criteria, optimization, model validation. The team approach. Systems design. Examples, or methodology: mathematical programming, optimum seeking, simulation, gaming, heuristic programming. Examples, or applications: theory of inventory, economic ordering under deterministic and stochastic demand. The production smoothing problem, linear and quadratic cost functions. Waiting line problems: single and multiple servers with Poisson input and output. The theory of games for two-person competitive situations. Project management through probabilistic activity networks and deterministic activity network (CPM-PERT). *(Fall)*

OPRS 7125. Stochastic Processes. (3) Same as MATH 7125.

OPRS 8101. Introduction to Operations Research. (3) See description for OPRS 6101.

OPRS 8125. Stochastic Processes. (3) Same as MATH 7125.

OPTICAL SCIENCE AND ENGINEERING

Department of Physics and Optical Science

101 Burson Building
704-687- 2537
http://www.physics.uncc.edu

Degrees

Ph.D. (Optical Science and Engineering)
M.S. (Optical Science and Engineering)

Coordinator

Dr. Robert K. Tyson
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Interdisciplinary Faculty

Department of Physics and Optical Science
Vasily Astratov - Assistant Professor
Angela D. Davies - Assistant Professor
Faramarz Farahi - Professor
Michael A. Fiddy – Professor
Greg J. Gbur – Assistant Professor
Tsing-Hua Her - Assistant Professor
Patrick J. Moyer - Associate Professor
Jeff Naeini - Assistant Professor
M. Yasin Akhtar Raja - Professor
Thomas J. Suleski - - Assistant Professor
Robert K. Tyson -Associate Professor

Department of Electrical and Computer Engineering
Stephen M. Bobbio – Professor
Lee W. Casperson - Professor
James M. Conrad – Associate Professor
Kasra Daneshvar - Professor
Mohamad A. Hasan - Associate Professor
Edward B. Stokes - Associate Professor
Raphael Tsu - Professor

Department of Chemistry
Bernadette T. Donovan-Merkert - Professor
Thomas D. DuBois – Professor
Mahnaz El-Kouedi – Assistant Professor
Kenneth E. Gonsalves – Professor
Daniel S. Jones – Associate Professor
Joanna K. Krueger – Assistant Professor
Jordan C. Poler - Associate Professor
Thomas A. Schmedake - Assistant Professor
Wade N. Sisk - Associate Professor

Department of Mathematics
Wei Cai – Professor
Yuri Godin – Assistant Professor
Michael V. Klibanov - Professor
Thomas R. Lucas – Professor
Stanislav Molchanov - Professor
Boris Vainberg - Professor

Department of Mechanical Engineering
Robert J. Hocken - Professor
Stuart T. Smith - Professor

Department of Computer Science
Teresa A. Dahlberg - Associate Professor
M. Taghi Mostafavi - Associate Professor
Kayvan Najarian – Assistant Professor

Department of Engineering Technology
Falih H. Ahmad - Associate Professor

Programs of Study

The M.S. and Ph.D. programs in Optical Science and Engineering are interdisciplinary involving six science and engineering departments [Physics & Optical Science, Chemistry, Mathematics, Electrical & Computer Engineering, Mechanical Engineering & Engineering Science, and Computer Science], the Center for Optoelectronics & Optical Communications, and the Center for Precision Metrology. The program is administered through the Department of Physics & Optical Science. The purpose of the program is to educate scientists and engineers who will develop the next generation of optical technology. The program emphasizes basic and applied interdisciplinary education and research in areas of optics that include:

- Optoelectronic devices and sub-assemblies
- Devices for telecommunications, sensors, and characterization
- Optical materials (semiconductors, polymer-organic and crystalline)
- Optical metrology
- Optical imaging
- Optical communication networks

Applications of this research include:

- Optical telecom and data-com
- High efficiency, tunable narrow bandwidth laser sources and detectors
- Smart structures for distributed sensing
- Wireless technologies for communications and remote sensing
- Materials and surface characterization
- Nanostructured optical devices
- Microelectronics
- Biosensing and medical imaging

A complete description of the research activity within the Optical Science and Engineering program can be accessed at the web address: http://optics.uncc.edu

Documents to be Submitted for Admission

1) Official transcripts from all colleges and universities attended.
2) Official GRE scores.
3) Official TOEFL scores (if the previous degree was from a country where English is not the official language).
4) The UNC Charlotte application for graduate admission form.
5) A minimum of three letters of reference.
6) An essay detailing the applicant's motivation and career goals.

M.S. IN OPTICAL SCIENCE AND ENGINEERING

Additional Admission Requirements

All applicants seeking admission into the Optics M.S. program must fulfill the university's general requirements for graduate admission at the M.S. level. Additional requirements for admission into the program are:

1) A baccalaureate or masters degree in Physics, Chemistry, Mathematics, Engineering, Optics, Computer Science, or a related field with a minimum undergraduate GPA of 3.0 overall and 3.0 (A = 4.0) in the major.
2) A minimal combined score of 1000 on the verbal and quantitative portions of the GRE, and satisfactory scores on the analytical and discipline specialty sections of the GRE.
3) A minimum score of 220 (computer-based test) or 557 (paper-based test) on the TOEFL if the previous degree was from a country where English is not the official language.
4) Positive letters of recommendation.
5) Students may be required to take undergraduate courses determined by the Optics Program Committee on an individual basis. Such courses will be specified at the time of admission into the program.

Degree Requirements

The degree of Master of Science in Optical Science and Engineering is awarded for completion of scholarly research that advances the knowledge base in the field of that research. Evidence of this is demonstrated by a successful thesis defense. Additionally, recipients of this degree should demonstrate mastery of relevant subject matter and a potential for success, usually in a position with government or industry.

The minimum requirement for the M.S. degree in Optical Science and Engineering is 32 credit hours beyond the baccalaureate degree that includes a minimum of 9 credit hours of thesis research, 2 credit hours of seminar (OPTI 6110), and a minimum of 21 credit hours of formal course work. The program of study must include at least 15 credit hours in approved courses having an OPTI prefix. The remaining 6 credit hours of required coursework may be selected from the listing of approved optics, engineering, and science electives.

All graduates of the program must demonstrate competency in the Core Curriculum. Students may demonstrate competency in the subject matter of the Core Curriculum by earning a grade of Pass on each of the five sections of a comprehensive qualifying examination. Each section of the comprehensive examination is based on subject matter in one of the five courses comprising the Core Curriculum. Students who do not receive a grade of Pass on a given section of the comprehensive examination must enroll in the corresponding Core Curriculum course. Students demonstrate competency in the Core Curriculum by passing the comprehensive examination or by earning a grade of B or better in those core courses not passed during the comprehensive examination.

Well-prepared students may earn a grade of pass on one or more of the five sections of the comprehensive examination. In those cases, credit hours that would have been earned in the courses, upon which the sections passed were based, may be replaced by credit hours in OPTI 6991, Thesis Research, and/or other electives approved by the student's Advisory Committee and the Optics Program Director.

A student in the M.S. program must maintain a minimum GPA of 3.0 in all coursework attempted for the degree. An accumulation of two C grades will result in termination of the student's enrollment in the program. A grade of U earned in any course will result in termination of the student's enrollment in the program.

Qualifier and Admission to Candidacy

All graduates of the program must demonstrate competency in the Core Curriculum. All students must prepare a Plan of Study before the end of the second semester following admission to the program. The Plan of Study must be approved by the Advisory Committee.

After successful completion of the Core Curriculum requirement and approval of the Plan of Study, the student will prepare a Research Plan for the thesis that is approved by the Advisory Committee. The Research Plan must demonstrate: (a) the student's knowledge of the relevant literature base, and (b) a research plan that, if successfully completed, will lead to an approved thesis. The student must present a written plan to the Advisory Committee. The student must also make an oral defense of the Research Plan at a presentation before the Advisory Committee.

After successfully demonstrating competency in the Core Curriculum, preparation of an approved Plan of Study, and approval of the Research Plan by the Advisory Committee, the student is admitted to candidacy. The qualifier, as described, must be completed within two years following admission to the program. A full-time student is normally expected to complete the qualifier prior to the end of the third semester following admission to the program.

Thesis
Each student will complete a minimum of 9 credit hours of thesis research. The student must present a written thesis to the Advisory Committee. The student must defend the thesis at a presentation before the Optics Faculty. Upon approval of the written thesis and oral presentation by the Advisory Committee, the student has successfully completed the thesis requirement. The thesis must be written using a format acceptable to the Graduate School.

Thesis Advisor and Advisory Committee
Each student in the program must have a Thesis Advisor and an Advisory Committee before being admitted to candidacy. The student should select a thesis advisor before the end of the first year of residency. The student and the thesis advisor jointly determine the advisory committee. The Thesis Advisor serves as Chair of the Advisory Committee and must be a member of the Optics Faculty at UNC Charlotte. The advisory committee must have at least 3 members, the majority of which must be members of the Optics Faculty. Composition of the Advisory Committee must be approved by the Optics Program Director.

Residency Requirement
The student must satisfy the residence requirement for the program by completing 12 credit hours of continuous enrollment in coursework/thesis credit. Residence is considered continuous if the student is enrolled in one or more courses in successive semesters until 12 credit hours are earned.

Time Limit for Completion of Program Requirements
All program requirements must be completed within 5 calendar years from the date the student is admitted into the program.

Transfer Credit Accepted
Up to 6 credit hours of approved coursework may be transferred from other accredited masters and doctoral programs. Only courses in which the student earned a grade of B or better (or its equivalent) can be transferred. No more than 6 credit hours of approved coursework taken as a post-baccalaureate student may be applied toward the degree. Credit for thesis research cannot be transferred.

Assistantships
Support for beginning graduate students is usually a teaching assistantship. Continuing students are often supported by research assistantships.

Comprehensive Examination
The thesis defense is the final examination.

Language Requirement
The program has no language requirement.

PH.D. IN OPTICAL SCIENCE AND ENGINEERING

Additional Admission Requirements
All applicants seeking admission into the Optical Science and Engineering Ph.D. program must fulfill the university's general requirements for graduate admission at the Ph.D. level. Additional requirements for admission into the program are:

1) A baccalaureate or masters degree in Physics, Chemistry, Mathematics, Engineering, Optics, Computer Science, or a related field with a minimum undergraduate GPA of 3.0 overall and 3.2 (A = 4.0) in the major. In the case a candidate presents a masters degree at application, a minimum graduate GPA of 3.2 (A = 4.0) on all graduate work is required.
2) A minimal combined score of 1100 on the verbal and quantitative portions of the GRE, and satisfactory scores on the analytical and discipline specialty sections of the GRE.
3) A minimum score of 220 (computer-based test) or 557 (paper-based test) on the TOEFL if the previous degree was from a country where English is not the official language.
4) Positive letters of recommendation.
5) Students may be required to take undergraduate courses determined by the Optics Program Committee on an individual basis. Such courses will be specified at the time of admission into the program.

Degree Requirements
The degree of Doctor of Philosophy in Optical Science and Engineering is awarded for completion of scholarly research that advances the knowledge base in the field of that research. Evidence of this is demonstrated by a successful dissertation defense. Additionally, recipients of this degree should demonstrate mastery of relevant subject matter and a potential for success in future research and teaching.

The minimum requirement for the Ph.D. degree in Optical Science and Engineering is 72 credit hours beyond the baccalaureate degree that includes a minimum of 18 credit hours of dissertation and a minimum of 51 credit hours of formal coursework.

Each candidate for the degree must present:
1) 5 courses (15 credit hours) from the Optics Core Curriculum. Students may be exempted from some, or all, of the Core Curriculum courses by passing part, or all, sections of the comprehensive qualifying examination;
2) 3 semesters (3 credit hours) of Seminar (OPTI 8110);
3) A minimum of 21 credit hours (7 courses) in formal courses having an OPTI prefix;
4) A minimum of 44 credit hours of formal coursework selected from the list of optics electives and discipline specific courses approved for the optics program by the Interdisciplinary Optics Program Committee.

The remaining 7 credit hours needed to satisfy the requirement of 51 non-thesis credit hours are free electives, and may include additional coursework in courses approved for the optics program, independent study, seminar courses, and other discipline specific courses (i.e., computer science, chemistry, etc.) approved on a case-by-case basis by the student's Advisory Committee and the Optics Program Director.

All graduates of the program must demonstrate competency in the Core Curriculum. Students may demonstrate competency in the subject matter of the Core Curriculum by earning a grade of Pass on each of the five sections of a comprehensive qualifying examination. Each section of the comprehensive examination is based on subject matter in one of the five courses comprising the Core Curriculum. Students failing to receive a grade of Pass on a given section of the comprehensive examination must enroll in the corresponding Core Curriculum course. Students demonstrate competency in the Core Curriculum by passing the comprehensive examination or by earning a grade of B or better in those core courses not passed during the comprehensive examination.

Well-prepared students may earn a grade of pass on one or more of the five sections of the comprehensive examination. In those cases, credit hours that would have been earned in the courses upon which the sections passed were based may be replaced by credit hours in OPTI 8991, Dissertation Research, and/or other electives approved by the student's Advisory Committee and the Optics Program Director.

A student in the Ph.D. program must maintain a minimum GPA of 3.0 in all coursework attempted for the degree. An accumulation of two C grades will result in termination of the student's enrollment in the program. A grade of U earned in any course will result in termination of the student's enrollment in the program.

Qualifier and Admission to Candidacy

All graduates of the program must demonstrate competency in the Core Curriculum. All students must prepare a Plan of Study before the end of the third semester following admission to the program. The Plan of Study must be approved by the Advisory Committee.

After successful completion of the Core Curriculum requirement and approval of the Plan of Study, the student will prepare a Research Plan for the thesis that is approved by the Advisory Committee. The Research Plan must demonstrate: (a) the student's knowledge of the relevant literature base, and (b) a research plan that, if successfully completed, will lead to an approved thesis. The student must present a written plan to the Advisory Committee. The student must also make an oral defense of the Research Plan at a presentation before the Advisory Committee.

After successfully demonstrating competency in the Core Curriculum, preparation of an approved Plan of Study, and approval of the Research Plan by the Advisory Committee, the student is admitted to candidacy. The qualifier, as described, must be completed within two years following admission to the program. A full-time student is normally expected to complete the qualifier prior to the end of the third semester following admission to the program.

Dissertation

Each student will complete a minimum of 18 credit hours of dissertation. The student must present a written dissertation to the Advisory Committee. The student must defend the dissertation at a presentation before the Optics Faculty. Upon approval of the written dissertation and oral presentation by the Advisory Committee, the student has successfully completed the dissertation requirement. The dissertation must be written using a format acceptable to the Graduate School.

Dissertation Advisor and Advisory Committee

Each student in the program must have a Dissertation Advisor and an Advisory Committee before being admitted to candidacy. The student should select a dissertation advisor before the end of the second year of residency. The student and the dissertation advisor jointly determine the advisory committee. The Dissertation Advisor serves as Chair of the Advisory Committee and must be a member of the Optics Faculty at UNC Charlotte. The advisory committee must have at least 4 members, the majority of which must be members of the Optics Faculty. Composition of the Advisory Committee must be approved by the Optics Program Director.

Residency Requirement

The student must satisfy the residence requirement for the program by completing 20 credit hours of continuous enrollment in coursework/dissertation credit. Residence is considered continuous if the student is enrolled in one or more courses in successive semesters until 20 credit hours are earned.

Time Limit for Completion of Program Requirements

All program requirements must be completed within 8 calendar years from the date the student is admitted into the program.

Transfer Credit Accepted

Up to 30 credit hours of approved coursework may be transferred from other accredited masters and doctoral programs. Only courses in which the student earned a grade of B or better (or its equivalent) can be transferred. No more than 6 credit hours of approved coursework taken as a post-baccalaureate student may be applied toward the degree. Credit for dissertation research cannot be transferred.

Assistantships

Support for beginning graduate students is usually a teaching assistantship. Continuing students are often supported by research assistantships.

Comprehensive Examination

The dissertation defense is the final examination.

Language Requirement

The program has no language requirement.

Core Curriculum

A student in either the M.S. or Ph.D. program should plan to complete the core curriculum, shown below, during the first year of residence. Courses taken after completion of the core curriculum are elective, but must be approved by the student's Advisor and Advisory Committee. Courses in the core curriculum are prerequisites to elective OPTI courses. Students in the M.S. program are to enroll in courses having a 6XXX number. Students in the Ph.D. program are to enroll in courses having an 8XXX number.

Fall

OPTI6101/OPTI8101 Mathematical Methods of Optical Science and Engineering
OPTI6102/OPTI8102 Principles of Geometrical and Physical Optics
OPTI6104/OPTI8104 Electromagnetic Waves
OPTI6110/OPTI8110 Seminar

Spring

OPTI6105/OPTI8105 Optical Properties of Materials
OPTI6211/OPTI8211 Introduction to Modern Optics
OPTI6110/OPTI8110 Seminar

Approved Electives in the Research Concentrations: M.S. and Ph.D. Programs

CHEM6082 Surfaces & Interfaces of Materials
CHEM8147 Photochemistry
CHEM8155 Polymer Synthesis
ECGR5124 Digital Signal Processing
ECGR5138 Electronic Thin Film Materials and Devices
ECGR5140 Introduction to VSLI Processing
ECGR5165 Laser Electronics
ECGR5197 Fundamentals of Optical Engineering
ECGR8111 Systems Theory
ECGR8118 Applied Digital Image Processing
ECGR8121 Advanced Theory of Communications I
ECGR8122 Advanced Theory of Communications II
ECGR8125 Optoelectronic Information Processing
ECGR8132 Advanced Semiconductor Device Engineering I
ECGR8133 Advanced Semiconductor Device Engineering II
ITCS8132 Performance Analysis of Communication Networks
ITCS8140 Data Visualization
ITCS8152 Computer Vision
ITCS8153 Neural Networks
ITCS8166 Computer Communications & Networks
ITCS8168 Wireless Communication Networks
ITCS8186 Application Specific System Design and Simulation
ITSC8220 Pattern Recognition
ITCS8224 Bio Image Processing
MATH5143 Analysis I
MATH5144 Analysis II
MATH5165 Numerical Linear Algebra
MATH5172 The Finite Element Method
MATH5174 Partial Differential Equations
MATH5176 Numerical Methods for Partial Diff. Equations
MATH8176 Advanced Numerical Analysis
MEGR6181 Engineering Metrology
MEGR7182 Machine Tool Metrology
MEGR7283 Advanced Coordinate Metrology
MEGR8166 Mechanical Behavior of Materials I
PHYS6131 Classical Electromagnetism I
PHYS6132 Classical Electromagnetism II
PHYS6141 Quantum Theory I
PHYS6142 Quantum theory II
PHYS6271 Solid State Physics

Courses in Optical Science and Engineering (OPTI)

OPTI 6000. Selected Topics in Optics. (3) Prerequisite: Consent of Optics Program Director. Selected topics in optics from areas such as medical optics, adaptive optics, all optical networks, etc. May be repeated for up to 6 hours of credit with consent of the Optics Program Director. *(Fall/Spring/Summer)*

OPTI 6101. Mathematical Methods of Optical Science and Engineering. (3) Topics include: matrix

theory, series and Frobenius methods of solutions to ordinary differential equations, separation of variables techniques for partial differential equations, special functions, Fourier series, and transform methods. Topical coverage will emphasize applications specific to the field of optics. Three lecture hours per week. *(Fall)*

OPTI 6102. Principles of Geometrical and Physical Optics. (3) Ray analysis of common optical elements (mirrors, lenses and systems of lenses, prisms). Reflection and refraction at plane and spherical surfaces, thin and thick lenses, lensmaker's equation, field of view, and numerical aperture. Wave properties of light, superposition of waves, diffraction, interference, polarization, and coherence. Optics of thin films. Three lecture hours per week. *(Fall)*

OPTI 6103. Light Sources and Detectors. (3). The nature of light, blackbody radiation. Optical sources, including discharge lamps, light-emitting diodes, gas and solid state lasers. Quantum wells. Continuous wave and pulsed (mode-locked, Q-switched) lasers. Selected solid-state laser systems. Light detection, including thermal and quantum detectors, photomultiplier tubes, diode detectors. Noise in light sources and detectors. Three lecture hours per week. *(Fall, Odd Years)*

OPTI 6104. Electromagnetic Waves. (3) Maxwell's equations, the electromagnetic wave equation, and electromagnetic wave functions. Waves in dielectric and conducting media, dispersion. Reflection, refraction, transmission, internal reflection, and evanescent waves at an interface. Intensity. Introduction to guided waves. Three lecture hours per week. *(Fall)*

OPTI 6105. Optical Properties of Materials. (3) Prerequisite: OPTI 6104 or permission of the instructor. Photophysical and photochemical processes in materials. Linear and nonlinear optical properties of materials. Optical properties of semiconductors and crystals. Optical transmission, absorption, and reflection. Fluorescence of organic and inorganic materials. Chiral molecular systems. Three lecture hours per week. *(Spring)*

OPTI 6110. Seminar. (1) Prerequisite: Admission to Optics M.S. program. Topics include: discussion and analysis of topics of current interest in optics; effective techniques for making presentations and utilizing library materials; ethical issues in science and engineering. Attendance required. May be repeated for up to 2 hours credit. Two semesters of seminar required of all students in the Optics M.S. program. One to two hours of seminar per week. *(Fall/Spring)*

OPTI 6201. Fourier Optics and Holography. (3) Prerequisite: OPTI 6102 and OPTI 6104. Principles of scalar, Fresnel, and Fraunhofer diffraction theory. Coherent optical data processing. Optical filtering and data processing. Holography. Three lecture hours per week. *(Fall, Even Years)*

OPTI 6205. Advanced Optical Materials. (3) Prerequisites: OPTI 6104 and OPTI 6105 or ECGR 6133/8133. Molecular optical materials including fabrication methods. Luminescence centers; quenching. Nonlinear optics, including higher order terms of the susceptibility tensor. Photonic crystals. Three lecture hours per week. *(Fall, Odd Years)*

OPTI 6211. Introduction to Modern Optics. (3) Prerequisites: OPTI 6102 and 6104 or permission of the instructor. Fourier analysis and holography, coherence. Introduction to light production and detection. Optical modulation, including EO effect, Kerr effect, amplitude modulation, magnetooptic effect, photoelastic effect, and acousto-optic effect. Introduction to nonlinear optics. Photonic switching. Three lecture hours per week. *(Spring)*

OPTI 6212. Integrated Photonics. (3) Prerequisites: OPTI 6102 and OPTI 6104. Theory and application of optical waveguides, free-space micro-optics, and integrated photonic devices. Fabrication and integration techniques, including motivations for choice of approach (hybrid vs. monolithic, materials, size, performance, etc). Modeling and simulation. Students will be required to work with mathematical packages such as Matlab and/or Mathematica to illustrate key concepts and to implement beam propagation/optical modeling simulations. Three lecture hours per week. *(Spring, Odd Years)*

OPTI 6221. Optical Communications. (3) Prerequisite: OPTI 6102 and OPTI 6103. Introduction to optical communications and basic communication block such as lasers, optical modulators, and optical transceivers. Review of fibers (attenuation, dispersions, etc.). Optical amplifiers. Passive and active photonic components such as tunable lasers and filters. Coherent and incoherent detection. Signal processing, photonic switching, and point-to-point links / connections. Three lecture hours per week. *(Spring, Even Years)*

OPTI 6222. Optical Communication Networks. (3) Prerequisite: OPTI 6221 or graduate standing in ECE, CS, or IT. Optical signal coding, multiplexing and de-multiplexing. Time-domain medium access (TDM (SONET) and TDMA), wavelength-division multiplexing (WDM and WDMA). Optical networks, add-drop multiplexing (OADM), switching and routing technologies, Dispersion management. Optical clock and timing recovery. Optical amplification, wavelength conversion, transport, and networking protocols. Broadband ISDN concepts. Access, metro, and long-haul network topologies. Three lecture hours per week. *(Fall, Even Years)*

OPTI 6241. Optical System Function and Design. (3) Prerequisite: OPTI 6102. Advanced study of telescopes, microscopes, cameras, off-axis imaging systems, stops, apertures, multiple lenses, use and selection of ray trace

computer codes. Three lecture hours per week. *(Spring, Even Years)*

OPTI 6242. Optical Propagation in Inhomogeneous Media. (3) Prerequisite: OPTI 6102 and OPTI 6104. Advanced study of free space propagation, scattering, and scintillation of Gaussian and uniform beam waves. Random processes, weak fluctuation theory, propagation through complex paraxial optical systems *(Spring, Odd Years)*

OPTI 6244. High Speed Photonics and Optical Instrumentation. (3) Prerequisite: OPTI 6103 and OPTI 6104. Study of instrumentation used for generation, detection, and manipulation of light in optical circuits. Topics include ultrashort pulse generation, photon-phonon interactions, 2nd & 3rd harmonic generation, squeezed light, optical tweezers, OPO, electro-optic modulators, selective polarizers, optical switches, amplifiers, multiplexing and mixing schemes, and application of CCD and CMOS cameras and detectors. Three lecture hours per week. *(Spring, Odd Years)*

OPTI 6261. Modern Coherence Theory. (3) Prerequisite: OPTI 6102 and OPTI 6104. Stochastic processes. Second order coherence of scalar and vector wavefields, radiation and states of coherence. Quantum wavefields. *(Fall, Odd Years)*

OPTI 6271. Advanced Physical Optics (3) Prerequisite: OPTI 6101, OPTI 6102, and OPTI 6104. Advanced study of electromagnetic wave propagation, stratified media, physics of geometrical optics, polarization and crystal optics, absorption and dispersion, interference, propagation and diffraction. Three lecture hours per week. *(Spring, Odd Years)*

OPTI 6281. Modern Optics Laboratory. (3) Prerequisite: OPTI 6102. Selected experiments in areas of modern optics such as fiber optics, interferometry, spectroscopy, polarization, optical metrology, and holography. Six laboratory hours per week. *(Spring, Even Years)*

OPTI 6691. Research Seminar. (1 - 3) Prerequisite: Consent of student's Advisory Committee. A seminar in which independent study may be pursued by the student, or a group of students, under the direction of a professor. May be repeated for up to a maximum of 6 credit hours. *(Fall/Spring/Summer)*

OPTI 6991. Thesis Research. (1 – 3) Prerequisite: Admission to candidacy. Research for the thesis. May be repeated for a total of 12 credit hours. Graded Pass/Fail. *(Fall/Spring/Summer)*

OPTI 7999. Masters Residence. (1) Prerequisite: OPTI 6991. Required of all Optics M.S. students who have completed all requirements for the degree except the thesis defense and are taking no other courses. *(Fall/Spring/Summer)*

OPTI 8000. Selected Topics in Optics. (3) Prerequisite: Consent of Optics Program Director. See OPTI 6000 for Course Description.

OPTI 8101. Mathematical Methods of Optical Science and Engineering. (3) See OPTI 6101 for Course Description.

OPTI 8102. Principles of Geometrical and Physical Optics. (3) See OPTI 6102 for Course Description.

OPTI 8103. Light Sources and Detectors. (3) See OPTI 6103 for Course Description.

OPTI 8104. Electromagnetic Waves. (3) See OPTI 6104 for Course Description.

OPTI 8105. Optical Properties of Materials. (3) Prerequisite: OPTI 8104 or permission of the instructor. See OPTI 6105 for Course Description.

OPTI 8110. Seminar. (1) Prerequisite: Admission to Optics Ph.D. program. Topics include: discussion and analysis of topics of current interest in optics; effective techniques for making presentations and utilizing library materials; ethical issues in science and engineering. Attendance required. May be repeated for up to 3 hours credit. Three semesters of seminar required of students in the Optics Ph.D. program during the first two years of residence. One to two hours of seminar per week. *(Fall/Spring)*

OPTI 8201. Fourier Optics and Holography. (3) Prerequisite: OPTI 8102 and OPTI 8104. See OPTI 6201 for Course Description.

OPTI 8205. Advanced Optical Materials. (3) Prerequisites: OPTI 8104 and OPTI 8105 or ECGR 6133/8133. See OPTI 6205 for Course Description.

OPTI 8211. Introduction to Modern Optics. (3) Prerequisite: OPTI 8102 and 8104 or permission of the instructor. See OPTI 6211 for Course Description.

OPTI 8212. Integrated Photonics. (3) Prerequisites: OPTI 8102 and OPTI 8104. See OPTI 6212 for Course Description.

OPTI 8221. Optical Communications. (3) Prerequisite: OPTI 8102 and OPTI 8103. See OPTI 6221 for Course Description.

OPTI 8222. Optical Communication Networks. (3) Prerequisite: OPTI 8221. See OPTI 6222 for Course Description.

OPTI 8241. Optical System Function and Design. (3) Prerequisite: OPTI 8102. See OPTI 6241 for Course Description.

OPTI 8242. Optical Propagation in Inhomogeneous Media. (3) Prerequisite: OPTI 8102 and OPTI 8104. See OPTI 6242 for Course Description.

OPTICS 8244. High Speed Photonics and Optical Instrumentation. (3) Prerequisite: OPTI 8103 and OPTI 8104. See OPTI 6244 for Course Description.

OPTI 8261. Modern Coherence Theory. (3) Prerequisite: OPTI 8102 and OPTI 8104. See OPTI 6261 for Course Description.

OPTI 8271. Advanced Physical Optics (3) Prerequisite: OPTI 8101, OPTI 8102, and OPTI 8104. See OPTI 6271 for Course Description.

OPTI 8281. Modern Optics Laboratory. (3) Prerequisite: OPTI 8102. See OPTI 6281 for Course Description.

OPTI 8691. Research Seminar. (1 - 3) Prerequisite: Consent of Optics Program Director. See OPTI 6691 for Course Description.

OPTI 8991. Dissertation Research. (1 – 3) Prerequisite: Admission to candidacy. Research for the dissertation. May be repeated for a total of 30 credit hours. Graded Pass/Fail. *(Fall/Spring/Summer)*

OPTI 9999. Doctoral Residence. (1) Prerequisite: OPTI 8991. Required of all Optics Ph.D. students who have completed all requirements for the degree except the thesis defense and are taking no other courses. *(Fall/Spring/Summer)*

PHYSICS

Department of Physics and Optical Science

100 Burson Building
704-687- 2537
http://www.physics.uncc.edu

Degrees

M.S. (Applied Physics)

Coordinator

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Faculty

Yildirim Aktas - Associate Professor
Vasily Astratov - Assistant Professor
Thomas M. Corwin - Professor
Angela Davies - Assistant Professor
Faramarz Farahi - Professor
Michael A. Fiddy - Professor
Greg Gbur - Assistant Professor
Tsing-Hua Her - Assistant Professor
Billy F. Melton - Associate Professor
Patrick Moyer - Associate Professor
Jeff Naeini - Assistant Professor
M. Yasin Akhtar Raja - Associate Professor
Robert Splinter - Adjunct Assistant Professor
Thomas J. Suleski - Assistant Professor
Susan R. Trammell - Assistant Professor
Robert K. Tyson - Associate Professor

MASTER OF SCIENCE IN APPLIED PHYSICS

The Applied Physics degree program is excellent preparation for those planning to continue their education through the Ph.D., either in physics or an engineering field, or for a career as an instructor in a two-year college. Students electing the Thesis Option will be well qualified for employment in industry or in a research laboratory.

While students have opportunities for research in optics, astronomy, plasma physics, and nuclear magnetic resonance, the research emphasis in the Department is in the area of applied optics. The Department of Physics and Optical Science is a major participant, and the administrative coordinator, of M.S. and Ph.D. programs in Optical Science and Engineering. These degree programs are interdisciplinary involving six science and engineering departments [Physics & Optical Science, Chemistry, Mathematics, Electrical & Computer Engineering, Mechanical Engineering & Engineering Science, and Computer Science], the Center for Optoelectronics & Optical Communications, and the Center for Precision Metrology. The program emphasizes basic and applied interdisciplinary education and research in areas of optics that include:

- Optoelectronic devices and sub-assemblies
- Devices for telecommunications, sensors, and characterization
- Optical materials (semiconductors, polymer-organic and crystalline)
- Optical metrology
- Optical imaging
- Optical communication networks

A complete description of the programs and course offerings in Optical Science and Engineering can be accessed at the web address http://optics.uncc.edu and under the OPTI listing in the Graduate Catalog.

Degree Requirements

The Department of Physics and Optical Science has three concentrations within the M.S. in Applied Physics program that include both thesis and non-thesis degree options.

1) Applied Physics Concentration (Thesis or non-thesis option)
2) Applied Optics Concentration (Thesis option only),
3) Medical Physics Concentration (Non-thesis option only).

All degree options require the completion of 30 credit hours approved by the Physics and Optical Science Department. A minimum of 15 credit hours presented for the degree must be in courses numbered 6000 and above. Courses for which undergraduate credit has been awarded may not be repeated for graduate credit. A minimum grade point average of 3.0 is required on all coursework attempted for the degree. At the time of admission up to 6 semester hours of graduate transfer credit may be accepted if approved by the Department of Physics and Optical Science and the Graduate School. All candidates for the degree must pass a final examination administered by the student's Advisory Committee.

A student selecting the thesis option must present credit for at least 6 semester hours of PHYS 6991. The thesis defense is the final examination for a student selecting the thesis option.

A student selecting the non-thesis option must pass a final examination administered by the student's Advisory Committee. Example questions relating to subject matter for the examination will be prepared by the Advisory Committee and given to the student at least 30 days prior to the examination date. The student will prepare responses to these questions and make an oral presentation to members of the Committee that is based upon the prepared responses. Committee members may question the student on any and all aspects of the relevant test material.

A student selecting the Medical Physics concentration should do so prior to enrolling. The Medical Physics concentration is designed for students wishing to pursue careers in such medical fields as radiology or medical imaging or as a research scientist/technician with companies developing and manufacturing medical equipment.

The medical physics concentration is designed to accept students having undergraduate majors in physics, chemistry, and engineering. Applicants for admission to the Medical Physics concentration must, as a minimum, present earned credit for the equivalent of the UNC Charlotte courses listed below.

PHYS 2101 and
PHYS 2101L Physics for Science and Engineering I - 4 credit hours
PHYS 2102 and
PHYS 2102L Physics for Science and Engineering II - 4 credit hours
PHYS 3101 Topics and Methods of General Physics - 3 credit hours
PHYS 3141 Introduction to Modern Physics - 3 credit hours
MATH 1241, 1242, 2241, 2242, and 2171 - 15 credit hours
CHEM 1251, 1251L, 1252, 1252L - Principles of Chemistry - 8 credit hours

Students lacking courses in anatomy and physiology will be required to take BIOL 1273 and 1273 Laboratory - Human Anatomy and Physiology - 4 credit hours. Students lacking courses in basic circuit theory and electronics will be required to take ECGR 2161 - Basic Electrical Engineering I - 3 credit hours.

A candidate for the degree must present credit for the following courses.

PHYS 6210 Theoretical Physics
PHYS 5232 Electromagnetic Theory II
PHYS 5242 Modern Physics II
PHYS 6261 Nuclear and Particle Physics
PHYS 6301 Radiation Detection, Instrumentation, and Data Analysis
PHYS 6302 Radiation Protection and Dosimetry
PHYS 6303 Imaging in Medicine
PHYS 6304 Physics of Diagnostic Radiology and Radiotherapy
PHYS 6401 Clinical Medical Physics (6 credit hours)

Entering students not having the equivalent of PHYS 4222, PHYS 4232, or PHYS 4242 are required to take PHYS 5222, PHYS 5232, and/or PHYS 5242, as appropriate, before the end of their first year of residence. A student may, with departmental approval, apply up to 9 semester hours from such related areas as Optics, Mathematics, Chemistry, and Engineering toward the 30 credit hour degree requirement.

Additional Admission Requirements

In addition to fulfilling the university's general requirements for graduate admission at the Master's level, applicants seeking admission into the M.S. in Applied Physics program must also:

1) Possess a Bachelor's degree in Physics, or a closely allied field, usually from an accredited college or university. Applicants from fields other than Physics may expect to be required to remove deficiencies in their physics background.
2) Present satisfactory scores on the aptitude portion of the Graduate Record Examination.
3) Possess an overall grade point average of at least 2.75 (based on a 4.0 scale) on all of the applicant's

previous work beyond high school. The average in the major should be 3.0 or better.
4) Present satisfactory scores on the Test of English as a Foreign Language, if the applicant is from a non-English speaking country.
5) Demonstrate evidence of sufficient interest, ability, and preparation in physics to adequately profit from graduate study, as determined by the Physics Department's Graduate Committee.

Admission to Candidacy

In addition to the general requirements for admission to candidacy, students enrolled in the Master of Science program in Applied Physics program should have:
1) Removed all identified entrance deficiencies by the time of application for admission to candidacy,
2) Completed at least 18 approved credit hours with a GPA of 3.0 or better, and
3) Selected a major advisor and formed an advisory committee.

Assistantships

Support for beginning graduate students is usually a teaching assistantship. Continuing students are often supported by research assistantships.

Comprehensive Examination

All candidates for the degree must pass a final examination. The thesis defense is the final examination for those students who select the thesis option.

A student selecting the non-thesis option must pass a final examination administered by the student's Advisory Committee. Subject matter for the examination will be prepared by the student's Advisory Committee and given to the student at least 30 days prior to the examination date. The student will make an oral presentation to members of the Committee that is based upon the prepared response. Committee members may question the student on any and all aspects of the relevant test material.

Advisory Committee

Each student in the M.S. in Applied Physics Program must have a major advisor and an advisory committee. The student should select a major advisor before the end of the first year of residency. The student and the major advisor jointly determine the advisory committee. The advisory committee must have at least 3 members, the majority of which must be from the Department of Physics and Optical Science. The major advisor and the advisory committee must be in place prior to applying for degree candidacy.

Courses in Physics

Any physics course at the 5000 or 6000 level can be applied to the 30-hour requirement. Any other courses to be applied toward the 30-hour-course requirement must be approved, in advance, by the Physics Department. Courses approved by the Physics Department as appropriate for meeting the 30-hour-degree requirement are listed below. A minimum of 15 credit hours must be in courses with a 6000 number.

PHYS 5000. Selected Topics in Physics. (0-4) Prerequisite: Consent of instructor. Selected advanced topics in physics. May be repeated with approval of the Department. *(On demand)*

PHYS 5210. Theoretical Physics. (3) Prerequisite: Consent of instructor. Topics include: Matrices, power series, solutions to ordinary and partial differential equations, Hilbert space, Fourier integrals, boundary value problems, Green's functions, and complex analysis. *(Fall)*

PHYS 5220. Computational Methods in Physics. (3) Prerequisite: Consent of instructor. Use of computers in solving physics problems including computational and mathematical methods to solve problems in classical mechanics, quantum mechanics, electromagnetism, nuclear physics, optics, and solid state physics. Computer solutions include numerical methods of integration, solving differential equations, curve fitting, and statistical analysis in physics. *(On demand)*

PHYS 5222. Classical Mechanics II. (3) Prerequisite: PHYS 3121 and MATH 2241. Continuation of PHYS 3121. The second course of a two-semester sequence treating particle dynamics, the motion of systems of particles, rigid body motion, moving coordinate systems, Lagrange's equations, Hamilton's equations, and small oscillations. Three lecture hours a week. *(Spring)*

PHYS 5231. Electromagnetic Theory I. (3) Prerequisites: For physics majors, PHYS 3121 with a grade of C or better; Others: consent of instructor; MATH 2171, MATH 2241. Corequisite: MATH 2242. The first course of a two-semester sequence. Topics considered include electrostatics and magnetostatics in free space and in matter, the motion of charged particles in electric and magnetic fields, capacitance, dielectric theory, field energy, electromagnetic induction and inductance, vector and scalar potentials, magnetic properties of matter. Maxwell's equations, solutions of Maxwell's equations in free space and in matter, propagating electromagnetic waves, and boundary value problems. *(Spring)*

PHYS 5232. Electromagnetic Theory II. (3) Prerequisite: PHYS 4231. Continuation of PHYS 4231. The second course in a two-semester sequence. Topics include magnetostatics in free space and in matter, electromagnetic induction, vector and scalar potentials, magnetic properties of materials, Maxwell's equations in free space and in matter, propagating electromagnetic waves, and boundary value problems. Three lecture hours a week. *(Fall)*

PHYS 5242. Modern Physics II. (3) Prerequisite: PHYS 4241. An extension of PHYS 4241 to include more advanced topics such as generalized eigenvalue problems, angular momentum, spin, the hydrogen atom, and perturbation theory, with selected applications from atomic, solid state, and nuclear physics. Three lecture hours a week. *(Spring)*

PHYS 5271. Principles of Geometrical and Physical Optics. (3) Prerequisites: PHYS 2102 with a grade of C or better, senior standing, and MATH 2171. Exceptions by consent of the instructor. Topics include the mathematics of wave motion, light as an example of an electromagnetic wave, the superposition of periodic and non-periodic waves, and selected topics from geometrical and physical optics. *(Fall)*

PHYS 6101. Biophysics. (3) Prerequisite: Consent of instructor. Will include principles of physics relevant to biological media; electrical activity, optical microscopy, and spectrophotometry. Photosynthesis and light absorption. Models of blood flow and the cardiovascular system. Dynamics of membrane lipids and ionic flow. Visual and audio systems. Radiation biophysics, ultrasonic interaction in biological media. Credit cannot be awarded for both PHYS 6101 and 8101. *(Fall)*

PHYS 6121. Classical Dynamics. (3) Prerequisite: PHYS 4222. Variational principles and Lagrange's equations. Hamilton's principles and mechanics of particles. The two-body central force problem. Rigid body motion. Small oscillations and the eigenvalue equation. *(Spring, alternate years)*

PHYS 6131. Classical Electromagnetism I. (3) Prerequisite: PHYS 4232. Electrostatic and boundary value problems. Multipole expansions, dielectrics and magnetostatics. Maxwell's equations, time varying fields and conservation laws. Plane electromagnetic waves and wave propagation. Wave guides and resonant cavities. Simple radiating systems. Scattering and diffraction theory. *(Fall, alternate years)*

PHYS 6132. Classical Electromagnetism II. (3) Prerequisite: PHYS 6131. Special theory of relativity. Dynamics of relativistic particles and electromagnetic fields. Charged particle collisions and scattering. Radiation by moving charges. Bremsstrahlung, virtual quanta, and beta decay theory. Multipole expansions and fields. Radiation damping. Self-fields of particles. Scattering and absorption of radiation by a bound system. *(On demand)*

PHYS 6141. Quantum Theory I. (3) Prerequisite: PHYS 4242. Principles of non-relativistic wave mechanics. The Schrodinger equation, linear harmonic oscillator and WKB approximation. Central forces and angular momentum. The hydrogen atom. *(Fall, alternate years)*

PHYS 6142. Quantum Theory II. (3) Prerequisite: PHYS 6141. Scattering theory, linear vector spaces, spin, two level systems. Quantum dynamics, symmetry operations, bound state and time-dependent perturbation theory. Theory of scattering, angular momentum, and identical particles. *(On demand)*

PHYS 6201. Fourier Optics. (3) Prerequisite: PHYS 4271 or consent of instructor. Principles of scalar, Fresnel, and Fraunhofer diffraction theory. Coherent optical imaging systems, optical filtering, optical data processing, and holography. Application of Fourier optics and holography. *(Fall, Even Years)*

PHYS 6210. Theoretical Physics. (3) Prerequisite: Consent of Department. Topics include: Matrices, power series, solutions to ordinary and partial differential equations, Hilbert space, Fourier integrals, boundary value problems, Green's functions, and complex analysis. *(Fall)*

PHYS 6211. Introduction to Modern Optics. (3) Prerequisite: PHYS 4271 or consent of department. Theory of laser oscillation, optical resonators, interaction of radiation and atomic systems, giant pulsed lasers, laser systems. Wave propogation in non-linear media, modulation of optical radiation, noise in optical detection and generation. Interaction of light and sound. Laser types and applications including the free-electron laser. *(Spring)*

PHYS 6220. Computational Methods in Physics. (3) Prerequisite: PHYS 5210. Use of computers in solving physics problems including computational and mathematical methods to solve problems in classical mechanics, quantum mechanics, electromagnetism, nuclear physics, optics, and solid state physics. Computer solutions include numerical methods of integration, solving differential equations, curve fitting, and statistical analysis in physics. *(On demand)*

PHYS 6221 Optical Communications I. (3) Prerequisite: Prerequisites: PHYS 4242, 6241,or ECGR 5165. Introduction to optical communications. Optical waveguides (attenuation, dispersions, etc.). Basic communication blocks such as lasers, optical modulators, and optical transceivers. Passive and active photonic components such as tunable lasers, optical amplifiers, SOAs, l-converters, and filters. Coherent and incoherent detection. Signal processing, photonic switching, and point-to-point connections. Three lecture hours per week. *(Spring)*

PHYS 6241. Light Sources and Detectors. (3) Prerequisite: PHYS 4241 or consent of department. Wave nature of light, basic semiconductor properties, light sources, light detectors and modulators, optical waveguides, optical systems with applications, and selected topics in non-linear optics. *(Fall, Odd Years)*

PHYS 6251. Statistical Physics. (3) Prerequisite: Consent of instructor. Classical and quantum statistical mechanics. Statistical thermodynamics. Ensembles, partition functions, fluctuations, ideal Fermi and Bose gas systems. *(On demand)*

PHYS 6261. Nuclear and Particle Physics. (3) Prerequisite: Consent of instructor. Properties of nuclei, nuclear models, and interactions. Nuclear reactions, fission, and fusion. Alpha, beta, and gamma decay. One and two particle states. Relativistic kinematics, principle of invariance, quantum numbers, elementary particles and models. *(On demand)*

PHYS 6271. Advanced Solid State Physics. (3) Prerequisite: Consent of instructor. Crystal structure. Electromagnetic, electron, mechanical, and elastic wave interactions with crystals. Theory of X-ray diffraction. Energy band theory of metals and semiconductors. Optical properties of solids, phase transitions, and amorphous solids. Quantum mechanics of covalent bonding, phonon excitation, and thermal energy. *(On demand)*

PHYS 6281. Modern Optics Laboratory. (3) Prerequisite: PHYS 3281 or consent of instructor. Selected experiments in such modern optics areas as fiber optics, holography, spectroscopy, and Fourier optics. Six laboratory hours each week. *(Spring, Even Years)*

PHYS 6301. Radiation Detection, Instrumentation, and Data Analysis. (3) Corequisites: PHYS 6261. Charged particle, neutron, and photon detection. Signal processing and data recording methods including techniques of data analysis and error propagation. The course will consist of two lectures and one two-hour laboratory each week. The course will emphasize application of radiation detectors used in radiotherapy and diagnostic radiology. Two lecture hours and one two-hour laboratory each week. *(Fall)*

PHYS 6302. Radiation Protection and Dosimetry. (3) Corequisites: PHYS 6261. Radiation dosimetry fundamentals including photon, electron, and neutron dosimetry. Radiation transport. Fundamentals of radiation protection and shielding. Assessment of effective dose. Three lecture hours per week. *(Fall)*

PHYS 6303. Imaging in Medicine. (3) Prerequisites: PHYS 6210 and PHYS 6301. The fundamental conceptual, mathematical, and statistical aspects of imaging science, and a survey from this formal viewpoint of various medical imaging modalities, including film-screen radiography, positron and x-ray computed tomography, ultrasound, and magnetic resonance imaging. *(Spring)*

PHYS 6304. Physics of Diagnostic Radiology and Radiotherapy. (3) Prerequisites: PHYS 5210 and PHYS 6302. Physics of x-ray diagnostic procedures and equipment Physics of the interaction of the various radiation modalities with body-equivalent materials. Physical aspects of clinical applications including radiation therapy to cause controlled biological effects in patients. Three lecture hours per week. *(Spring)*

PHYS 6401. Clinical Medical Physics. (1-3) Prerequisite: Consent of Program Director. Eighty to one hundred supervised contact hours of clinical internship at a regional health care system. May be repeated for a maximum of 12 credit hours. Graded Pass/No-credit. *(Fall, Spring, Summer)*

PHYS 6991. Physics Thesis Research I. (1-3) Prerequisite: admission to candidacy and consent of instructor. Research for the thesis. Letter grade assigned. May be repeated to accumulate a maximum of 6 hours credit. *(Fall, Spring, Summer)*

PHYS 6992. Physics Thesis Research II. (1-4) Prerequisite: PHYS 6991 and consent of instructor. Research for the thesis. Graded pass/no-credit. May be repeated to accumulate a maximum of 4 hours credit. *(Fall, Spring, Summer)*

PHYS 7999. Graduate Residence (1) Required of all masters students who are working on or defending thesis projects, and/or are scheduled for comprehensive examinations, but who are not enrolled in other graduate courses. *(Fall, Spring, Summer)*

PHYS 8101. Biophysics. (3) See PHYS 6101 for Course Description.

PSYCHOLOGY

Department of Psychology

4018 Colvard Building
704-687-4731

Degree

M.A.

Clinical/Community Coordinator

Dr. Richard Tedeschi

Industrial/Organizational Director

Dr. Steven Rogelberg

Graduate Faculty

Clinical/Community Psychology
Art Blume, Associate Professor
Lawrence G. Calhoun, Professor
James R. Cook, Associate Professor
George Demakis, Assistant Professor

C. D. (Denny) Fernald, Associate Professor Emeritus
Ryan Kilmer, Assistant Professor
Albert A. Maisto, Bonnie Cone Distinguished Professor
Richard D. McAnulty, Associate Professor
Amy Peterman, Associate Professor
Sam Simono, Professor Emeritus
Richard Tedeschi, Professor and Coordinator

Industrial/Organizational
Anita Blanchard, Assistant Professor
Kimberly K. Buch, Associate Professor
David C. Gilmore, Associate Professor
Eric Heggestad, Assistant Professor
Jo Ann Lee, Associate Professor
Charlie Reeve, Assistant Professor
Steven Rogelberg, Associate Professor and Director
William D. Siegfried, Associate Professor

Other members of the Graduate Faculty
Arnie Cann, Professor
Brian Cutler, Professor
Mark Faust, Assistant Professor
Paul W. Foos, Professor
Virginia Gil-Rivas, Assistant Professor
Jane F. Gaultney, Associate Professor
Paula Goolkasian, Professor
Nakia Gordon, Assistant Professor
Douglas L. Grimsley, Professor
Susan K. Johnson, Assistant Professor
W. Scott Terry, Professor
Lori Van Wallendael, Associate Professor
Jennifer Welbourne, Assistant Professor

MASTER OF ARTS

Clinical/Community Psychology

The objective of the master's degree program in Clinical/Community Psychology is to train psychologists in the knowledge and skills necessary to address problems encountered in modern living. The program provides a foundation in the research methods and content of basic psychology as well as training in the applied skills of professional practice. The relatively small, competitively selected student body receives individual attention from faculty members who maintain rigorous standards of academic excellence.

Students develop knowledge and skills in psychological assessment, learn various treatment and intervention strategies, and work with a variety of populations in consultation, evaluation, and research. An extensive practicum component utilizes the Charlotte area as a setting for applied experience.

The program prepares students for the North Carolina psychology licensure exam and for positions in diverse settings such as community mental health centers, correctional facilities, and other human service programs. A number of graduates have gone on to pursue a doctoral degree.

Additional Admission Requirements

To be considered for admission to graduate study in Clinical/Community Psychology, a student must present the following requirements in addition to those required by the Graduate School:

1) Completed application by March 1
2) 18 hours of undergraduate psychology including Introductory Psychology & Research Methods
3) An undergraduate course in statistics
4) Acceptable scores on the Verbal and Quantitative GRE
5) The GRE subject test in psychology is *strongly* recommended

Admission to the program is very competitive for the spaces available each year. Most students who are admitted have much better records than the minimum required. The primary Clinical/Community Psychology application deadline is March 1 for admission in the fall semester, but if space is still available, late applications will be considered until May 1. Students may not begin the program during the spring semester.

Degree Requirements

The Clinical/Community Psychology program requires at least 48 semester hours of graduate coursework. Full-time students should be able to complete the program in two calendar years. A thesis and comprehensive exam are required.

Basic Knowledge and Methods in Psychology (14 hours)

PSYC6102	Research Design and Quantitative Methods in Psychology (3)
PSYC6107	Ethical and Professional Issues in Psychology (2)
PSYC6999	Thesis (3)

and two courses (6 hours) selected from the following:

PSYC6010	Topics in Learning and Cognition (3)
PSYC6015	Topics in Perception and Physiological Psychology (3)
PSYC6020	Topics in Developmental Psychology (3)
PSYC6030	Topics in Social Psychology and Personality (3)

Clinical/Community Coursework (34 hours)

PSYC6050	Topics in Psychological Treatment (3)
PSYC6141	Intellectual Assessment (4)
PSYC6142	Personality Assessment (4)
PSYC6145	Applied Research Design and Program Evaluation (3)
PSYC6150	Psychological Treatment (4)
PSYC6151	Behavior Disorders (4)
PSYC6155	Community Psychology (3)
PSYC6450	Practicum in Clinical Psychology (3)

PSYC6455 Practicum in Community Psychology (3)

Or a second

PSYC6450 Practicum in Clinical Psychology (3)
Elective (Selected in consultation with adviser.) (3)

Hours beyond the 48 hours may be required by the academic adviser and the Clinical/Community Program Committee. The faculty conduct a thorough review of student performance on a regular basis. Continuation in the program is contingent upon a favorable review during these evaluations. Students who consistently show borderline course performance, who are not developing good applied skills in the practice of psychology, who fail to complete coursework in a timely basis, or who otherwise perform unprofessionally or unsatisfactorily, may be required to complete additional courses or practicum work, or may be removed from the program. The enrollment of a student who receives three grades of *C* or one *Unsatisfactory* grade during his or her graduate career is automatically terminated.

Comprehensive Examinations

All students are required to successfully complete comprehensive examinations covering research design, ethics and knowledge of clinical/community psychology. Students who fail the comprehensive exam twice are removed from the program.

Assistantships

A variety of resources are available for financial assistance. These include teaching assistantships to proctor the general psychology laboratory, research assistantships from faculty grants, and graduate assistantships in other campus units such as the Learning Center and Disability Student Services. These range in pay from $8,000 to $12,000 per academic year.

Research Experiences

Students are encouraged to become involved in ongoing research in the department, and they are required to complete a thesis.

Practica

Practica, involving practical experience working with human service agencies in the region, are a required part of the program.

MASTER OF ARTS

Industrial/Organizational Psychology

The objective of the master's degree program in Industrial/Organizational Psychology is to train students in the knowledge and skills necessary to research and improve the world of work from both an employee and organizational point of view. The program provides a foundation in the research methods and content of basic psychology as well as training in the applied skills of professional practice. Among the issues students learn about include personnel selection, training and development, performance evaluation, workplace health, employee attitudes and satisfaction, work motivation, team and organizational effectiveness, and change management. The relatively small, competitively selected student body receives individual attention from faculty members who maintain rigorous standards of academic excellence.

Additional Admission Requirements

To be considered for admission to graduate study in Industrial/Organizational Psychology, a student must present the following requirements in addition to those required by the Graduate School:

1) Completed application by February 1
2) Acceptable scores on the Verbal and Quantitative GRE

18 hours of undergraduate psychology including Introductory Psychology, Research Methods, and Statistics are recommended.

Admission to the Industrial/Organizational program is very competitive for the spaces available each year. The primary application deadline is February 1 for admission in the fall semester, but if space is available, late applications will be considered until May 1. Students may not begin the program during the spring semester.

Degree Requirements

The Industrial/Organizational program requires at least 48 semester hours of graduate coursework as specified below. Full-time students should be able to complete the program in two calendar years.

Basic Knowledge and Methods in Psychology (14 hours)

PSYC6102 Research Design and Quantitative Methods in Psychology (3)
PSYC6107 Ethical and Professional Issues in Psychology (2)
PSYC6999 Thesis (3)

and two courses (6 hours) selected from the following:

PSYC6010 Topics in Learning and Cognition (3)
PSYC6015 Topics in Perception and Physiological Psychology (3)
PSYC6020 Topics in Developmental Psychology (3)
PSYC6030 Topics in Social Psychology and Personality (3)

Industrial/Organizational Psychology (22 hours)

PSYC6140 Psychological Measurement and Evaluation (3)
PSYC6171 Industrial/Organizational Psychology (3)
PSYC6171L Laboratory in I/O Psychology (1)
PSYC6172 Personnel I (3)
PSYC6174 Organizational Dynamics I (3)

PSYC6175 Organizational Dynamics II (3)
PSYC6177 Personnel II (3)
PSYC6477 Projects in I/O Psychology (3)

Electives selected in consultation with Adviser (12 hours)
PSYC6124 Psychology of Aging (3)
PSYC6176 Counseling in Organizations (3)
PSYC6899 Readings and Research (3)
Graduate courses from other disciplines
Additional thesis hours

Students who consistently show borderline course performance, who fail to complete coursework on a timely basis, or who otherwise perform unprofessionally or unsatisfactorily, may be required to complete additional courses or may be removed from the program. The enrollment of a student who receives three grades of *C* or one *Unsatisfactory* grade during his or her graduate career is automatically terminated.

Comprehensive Examinations

I/O students are not required to take an independent comprehensive exam. Instead, all students are required to successfully defend their thesis project near the end of their program of study. The thesis defense itself is considered to be a comprehensive exam. The thesis defense can cover topics pertaining to research design, ethics, practical implications, and Industrial/Organizational Psychology in general.

Assistantships and Other Financial Assistance

A variety of resources are available for financial assistance. These include teaching assistantships to proctor the general psychology laboratory, research assistantships to assist on faculty grants, and graduate assistantships in psychology and other campus units such as the Learning Assistance Center and the University Honors Office. These range from $8,000 to $12,000 per academic year. Information on loans, grants and employment opportunities is available from the Financial Aid Office.

Research Experiences

In addition to the completion of a thesis, students have the opportunity to work with individual faculty members on their research. The Department of Psychology has an energetic and dynamic faculty of more than 30 psychologists who are committed to education and have established an excellent record or productivity in all the major areas of psychological research and professional practice. Students also have the opportunity to work closely with the Management Department faculty affiliated with the program (Chris Henle, Doug Pugh, Beth Rubin, Ben Tepper, Kelly Zellars) as well as two I/O faculty members from Davidson College affiliated with the program (John Kello, Scott Tonidandel).

Practica

An extensive practicum component utilizes the Charlotte area as a setting for applied experience. All students must complete 3 hours of Projects in I/O Psychology (PSYC 6477) and they are strongly encouraged to take 6 hours.

Courses In Psychology

PSYC 6010 Topics in Learning and Cognition. (3) An examination of selected topics in the areas of learning, memory and cognition, and behavior modification, with an emphasis on the applications to the areas of clinical, community and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6015. Topics in Perception and Physiological Psychology. (3) An examination of selected topics in the areas of sensation and perception, physiological and neuropsychology, with an emphasis on the applications to the areas of clinical, community, and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6020. Topics in Developmental Psychology. (3) An examination of selected topics in child and adult development, aging, and developmental disabilities, with an emphasis on the applications to the areas of clinical, community, and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6030. Topics in Social Psychology and Personality. (3) An examination of selected topics in personality and social psychology, with an emphasis on the applications to the areas of clinical, community, and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6050. Topics in Psychological Treatment. (3) Prerequisite: PSYC 6151. A topical course which will focus on issues in treatment, alternative treatment perspectives, special client populations. May be repeated for credit with departmental permission. *(Yearly)*

PSYC 6099. Topics in Psychology. (3) A discussion of selected topics in psychology. *(On demand)*

PSYC 6102. Research Design and Quantitative Methods in Psychology. (3) Prerequisites: MATH 1222 and PSYC 2102 or equivalent. Experimental and correlational methods of psychological research, including single subject designs with emphasis on research design and the application of statistical methods to psychological research. *(Fall)*

PSYC 6107. Ethical and Professional Issues in Psychology. (2) Roles and responsibilities of psychologists, including ethical standards in professional

practice, testing and research; expectations and problems confronting psychologists in industrial, clinical and professional organizations. *(Fall)*

PSYC 6111. Psychology of Learning and Memory. (3) Principles, theories and current research in learning with emphasis on human learning and memory. *(On demand)*

PSYC 6112. Applied Behavior Analysis. (3) Use of behavior principles in applied settings. Topics include: behavioral assessment, positive and negative reinforcement, punishment, extinction, stimulus control, maintenance and generalization of behavior change. Each student will design and carry out a behavior change project. *(On demand)*

PSYC 6113. Physiological Psychology. (3) The relationships between the nervous system and behavior. Topics include the structure of the nervous system and nerve conduction, the functional organization of the central nervous system, neuronal and hormonal control of behavior, biofeedback and other appropriate topics. *(On demand)*

PSYC 6115. Sensation and Perception. (3) Processes involved in receiving and interpreting sensory data including all the sensory systems with an emphasis on vision. *(On demand)*

PSYC 6120. Developmental Psychology. (3) Psychological development across the lifespan. *(On demand)*

PSYC 6124. Psychology of Aging. (3) Psychology of aging with particular emphasis on issues related to community/clinical psychology and industrial/organizational psychology. Topics include myths and stereotypes about aging, problems faced by older workers, retirement, mental health and normal aging, counseling the older adult, and psychological disorders in later life. *(Spring)*

PSYC 6130. Social Psychology. (3) Human social behavior; topics include affiliation, person perception, conformity and attitudes. *(On demand)*

PSYC 6135. Psychology of Personality. (3) A critical evaluation of major personality theories including an extensive survey of current research. *(On demand)*

PSYC 6140. Psychological Measurement and Evaluation. (3) Prerequisite: PSYC 6102. Measurement of psychological characteristics; scaling, reliability, validity and norms; construction and use of the intelligence tests, personality inventories, interest tests, attitude scales, etc., interviewing, survey techniques and behavioral assessment. *(Spring)*

PSYC 6141. Intellectual Assessment. (4) Theories of intelligence and methods of intellectual assessment, including practice in administering intelligence tests, interpreting results, and writing evaluation reports. Three lecture hours and one two-hour lab per week. *(Fall)*

PSYC 6142. Personality Assessment. (4) Prerequisite: PSYC 6151, 6141 or permission of department. Theories and methods used in the assessment of personality and psychopathology, including practice in administering personality tests, interpreting results and writing evaluation reports. Three lecture hours and one two-hour lab per week. *(Spring)*

PSYC 6145. Applied Research Design and Program Evaluation. (3) Prerequisite: PSYC 6102. Models of evaluative research; also techniques, designs and administration of program evaluation. Topics include role conflicts, entry issues, goal setting, research for program planning and implementation and examples of actual program design and evaluation. *(Spring)*

PSYC 6150. Introduction to Psychological Treatment. (4) Prerequisite: PSYC 6151. Major approaches to psychological intervention, including psychodynamic, behavioral, humanistic and cognitive-behavioral systems. Emphasis on practical therapy considerations, including crisis intervention, client behaviors at various stages of therapy, handling difficult clients and ethical and professional issues. Three lecture hours and one two-hour lab per week. *(Spring)*

PSYC 6151. Behavior Disorders. (4) Diagnostic systems in current use and the implications of these systems for psychologists; several perspectives on psychological processes, behavior disorders and diagnosis including psychodynamic, behavioral and social models; practice in diagnostic interviewing. Three lecture hours and one two-hour lab per week. *(Fall)*

PSYC 6153. Classification of Psychological Dysfunctions. (3) Introduction to systems for classifying psychological disorders for counselors and review of current theoretical, experimental, and clinical perspectives on abnormal psychology, including the current Diagnostic and Statistical Manual of Mental Disorders. Credit will not be given for both PSYC 6153 and PSYC 6151. *(Spring)*

PSYC 6155. Community Psychology. (3) Research, intervention techniques and settings associated with major approaches in community psychology including the mental health, organizational, ecological and social action models. *(Fall)*

PSYC 6171. Industrial/Organizational Psychology. (3) Human behavior within organizations. Topics include personnel selection and placement, job analysis, motivation, satisfaction, consumer psychology and ergonomics. *(Fall)*

PSYC 6171L. Laboratory in Industrial/ Organizational Psychology. (1) Corequisite: PSYC 6171. Practice in administration and scoring of surveys and tests. Experience in role plays, training practices, and interviews. *(Fall)*

PSYC 6172. Personnel I. (3) Prerequisite or corequisite: PSYC 6171, 6140. Techniques of applied personnel psychology. Topics include job analysis, testing in industry, interviews, personality measures, assessment centers, job evaluation, and polygraphs. *(Spring)*

PSYC 6173. Individual Dynamics. (3) The individual within the organization. Special emphasis on theories of motivation and job satisfaction. *(On demand)*

PSYC 6174. Organizational Dynamics I. (3) Prerequisite: PSYC 6171. Group processes, including group formation, group decision making, leadership and group structure. *(Spring)*

PSYC 6175. Organizational Dynamics II. (3) Prerequisite: PSYC 6174. Organization theories and organizational change methods. *(Fall)*

PSYC 6176. Counseling Psychology in Organizations. (3) Application of psychology to special problems within the organization, especially the counseling of employees experiencing life problems: for example, retirement, alcoholism, interpersonal conflict. *(On demand)*

PSYC 6177. Personnel II. (3) Prerequisite: PSYC 6172. Theoretical bases of personnel psychology. Topics include performance appraisal, legal issues, personnel strategies, validation issues, utility analysis, human resource planning and training. *(Fall)*

PSYC 6200. Health Psychology. (3) Intensive review of the contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, and the improvement of the health care system. The course will examine links between psychology and health by emphasizing interactions among biological, behavioral and social systems that impact health and illness experiences. Topics will include stress, coping, pain, chronic disease and psychoneuroimmunology. Emphasizes the relevance of age, gender, personality, and culture for understanding health related behaviors. *(Fall)*

PSYC 6202. Methods in Health Psychology. (3) Prerequisite: PSYC 6102 and PSYC 6200. Advanced review of qualitative and quantitative issues relevant to the conduct of health and behavior research. Topics include assessment of quality of life; instrument sensitivity, specificity, and responsiveness; and, the evaluation of health service delivery. Emphasizes the development of methodological, analytical, and interpretive skills necessary to evaluate practices, programs, and policies in health psychology. *(Spring)*

PSYC 6213. Physiological Foundations of Health Psychology. (3) Prerequisite: PSYC 6200. Biological theories and models will be introduced and applied to health issues. Topics may include addiction, mental illness, neuropsychology, and psychophysiology. Emphasizes the relation between the nervous system and behavior for understanding health and illness. *(Fall)*

PSYC 6230. Applications of Social Psychology to Health Psychology. (3) Prerequisite: PSYC 6200. Social psychology theories and models will be introduced and applied to health issues. Topics may include the role of social perception processes in understanding and adjusting to illness, social influence strategies and promoting health-maintaining behaviors, self-efficacy and coping, and other factors related to health maintenance or recovery. *(Spring)*

PSYC 6260. Topics in Health Psychology. (3) Prerequisite: PSYC 6200. An examination of selected topics in Health Psychology. May be repeated for credit with departmental approval. *(On demand)*

PSYC 6261. Independent Study in Health Psychology. (1-3) Prerequisite SYC 6200. Directed individual study of an issue in health psychology arranged with a faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

PSYC 6262. Internship in Health Psychology. (1-3) Prerequisite: PSYC 6200 and permission of the department. Experience in assessment and treatment with clients at local health agencies under supervision from a faculty member on campus. Applications of the principles of health psychology to special problems with in a health care organization or setting. May be repeated for credit with departmental approval. *(Fall, Spring, Summer)*

PSYC 6450. Practicum in Clinical Psychology. (1-3) Prerequisites: PSYC 6150 and permission of department. Experience in clinical assessment and/or psychotherapy with clients at local agencies under supervision from a faculty member on campus. May be repeated for credit with departmental approval. *(Fall, Spring, Summer)*

PSYC 6455. Practicum in Community Psychology. (1-3) Applications of the principles of community psychology to special problems within an organization or community setting. The project might include, but would not be limited to, consultation, program development, training, community education or program evaluation. May be repeated for credit with departmental approval. *(Fall, Spring)*

PSYC 6477. Projects in Industrial/Organizational Psychology. (1-3) Prerequisite: PSYC 6171. A structured practicum experience or research paper in

industrial/organizational psychology. May be repeated for credit with departmental approval. *(Fall, Spring, Summer)*

PSYC 6899. Readings and Research in Psychology. (1-4) Prerequisite: permission of instructor and department to be obtained in the semester preceding the semester in which the course is to be taken. Individual study in psychology which may take the form of conducting empirical research or formulating a critique and synthesis of existing research. May be repeated for credit. *(Fall, Spring, Summer)*

PSYC 6999. Thesis. (1-3) The thesis is coordinated with the student's interests and practical experience during the second year to allow the development of an area of specialization. Thesis projects can be of three types: an original experiment that will contribute to the psychological literature; a thorough case analysis including literature review and application; the development of a community psychology program or intervention to accomplish an important, well-defined goal. A completed paper and oral presentation are required. May be repeated for credit with departmental approval. *(Fall, Spring, Summer)*

PSYC 7999. Masters Degree Graduate Residence. (1) *(Fall, Spring, Summer)*

PUBLIC ADMINISTRATION

Department of Political Science
440 Fretwell Building
704-687-2577
http://www.mpa.uncc.edu

Degree
M.P.A., Certificate

Director
Dr. David Swindell

Graduate Faculty
A. Hunter Bacot, Associate Professor
William P. Brandon, Metrolina Medical Foundation Distinguished Professor of Health Policy
Joanne Carman, Assistant Professor
Gary Johnson, Assistant Professor
Suzanne Leland, Assistant Professor
Gary R. Rassel, Associate Professor
David Swindell, Associate Professor
Bradley Wright, Assistant Professor

MASTER OF PUBLIC ADMINISTRATION

The primary objective of the Master of Public Administration (M.P.A.) Degree program is to provide professional training in public administration. The curriculum of this accredited program emphasizes the analysis of the political and administrative environments as well as the administrative decision-making approaches of public administration. Application of techniques and administrative skills to the management of nonprofit organizations is also included in the curriculum. The methods of instruction employed in the program expose students to a variety of approaches to public management.

Students may enroll in the Master of Public Administration program on either a full-time or part-time basis. The majority of classes are scheduled in the evening throughout the year. However, some classes are scheduled on Saturdays and during the afternoon. Classes meet on the main campus and at UNC Charlotte Uptown Center.

Admission Requirements
Admission to the Master of Public Administration program is open to qualified graduates of recognized colleges and universities accredited by a regional or general accrediting agency. There are seven major requirements for admission:

1) Application in writing submitted to the Graduate Admissions Office, accompanied by the application fee, which is neither deductible nor refundable.
2) Possession of a bachelor's degree, or its equivalent, from an accredited college or university.
3) An undergraduate grade point average of at least 3.0 on a 4.0 scale.
4) An appropriate score on the Verbal, Quantitative, and Analytical portions of the Graduate Record Exam (GRE). Although there is no required score for these exams, typically an acceptable score would be above the 35th percentile.
5) A written statement of professional career goals and a description of any significant work experience, particularly in the public or nonprofit sectors.
6) Three supporting letters of recommendation from professors or employers.
7) Submission of two official transcripts from all postsecondary educational institutions in which the candidate was enrolled.

Prerequisite Requirements
In addition to the admission requirements, MPA students must complete the following prior to taking certain core courses and the comprehensive exams: POLS 1110, Introduction to American Government (or the equivalent); STAT 1222, Elementary Statistics for the Social Sciences (or the equivalent); and demonstrate

proficiency in computer applications. However, students may complete these after admission to the program.

Degree Requirements

The Master of Public Administration program is structured in three distinct phases: 1) core, 2) advanced work, and 3) directed study or research project. In all, the program requires 40 hours of graduate credit for completion of the degree. The MPA Program Handbook, available on the program web site, presents the most up-to-date listing of degree requirements.

1) Core

All students are required to complete 19 hours in core areas as defined by the program. The emphasis in the core is twofold: (a) Understanding the various managerial and analytical approaches salient to the environment of public administration, and (b) Achieving an overall perspective on the problems of public administration. After completing the core requirements each student must successfully complete a comprehensive examination covering the core courses. The core courses are:

MPAD6102 Foundations in Public Administration (3)
MPAD6104 Public Organizations and Management (3)
MPAD6125 Quantitative Research Methods in Public Administration (3)
MPAD6125L Computer Laboratory in Quantitative Research Methods (1)
MPAD6128 Public Policy Analysis and Program Evaluation (3)
MPAD6131 Public Budgeting and Finance (3)
MPAD6134 Human Resources Management (3)

2) Advanced Courses

a) Electives: The MPA program offers several advanced elective courses in areas important to public administrators including application of analytic tools and understanding of public administration processes. With the approval of the Director, students may take advanced elective work with other departments. Students are required to take a minimum of nine hours of advanced electives. The MPA electives are:

MPAD6000 Topics for Graduate Study in Public Administration (1-4)
MPAD6140 Labor Management Relations in Government (3)
MPAD6141 Conflict Management in Public Organizations (3)
MPAD6142 Managing Grants and Contracts in the Public & Nonprofit Sectors (3)
MPAD6143 Introduction to Administrative Law (3)
MPAD6144 Changing the Public Organization (3)
MPAD6160 Information Systems in Public Administration (3)
MPAD6170 Communication Law and Policy (3)
MPAD6172 Administration of Health Care Systems in the U.S. (3)
MPAD6174 Public Policy and Politics in Health Care Administration (3)
MPAD6176 Trends and Issues in Health Care Administration (3)
MPAD6185 Intergovernmental Relations (3)
MPAD6210 Aging and Public Policy (3)
MPAD6211 Administration of Aging Programs (3)
MPAD6310 Foundations of the Nonprofit Sector (3)
MPAD6311 Introduction to Nonprofit Management (3)
MPAD6320 Strategic Planning for Nonprofit Organizations (1)
MPAD6321 Resource Development in Nonprofit Organizations (1)
MPAD6322 Volunteer Management (1)
MPAD6323 Grant Writing (1)
MPAD6324 Financial Analysis for Government and Nonprofit Organizations (3)
MPAD6325 Legal Aspects of Nonprofit Organizations (1)
MPAD6820 Independent Study (1-3)

b) Capstone Seminar: Students are required to complete MPAD 6187: Advanced Seminar in Public Management Problem Solving as a capstone course after successfully completing the comprehensive examination.

3) Directed Study or Research Applications (each MPA student must complete one of the options "a" or "b" for 6 credits). Students must successfully complete the comprehensive examination prior to enrolling in any courses listed in this section.

a) Directed Study: Students who select this option will complete a written project on a topic of significance based on a field experience or research in public administration or nonprofit management. The Directed Study requires the following courses, graded on a pass/fail basis:

MPAD6800 Directed Study in Public Administration (Proposal) (3)
MPAD6801 Directed Study in Public Administration (Completed Study) (3)

University regulations governing the preparation and submission of Master's theses apply to the Directed Study option. Rules for the Directed Study committee are provided in the MPA Program Handbook.

b) Research Applications: Students who select this option will complete a one-semester written project on an approved topic of significance in public administration or nonprofit management. The project will include the submission of revised paper drafts based on instructor evaluation. Students must enroll in the following course which is graded A, B, C, or U:

MPAD 6188 Research Applications in Public Administration (3)

Students who select option "b" must also take one additional elective course for 3 credits to complete the 40 hours required for the MPA degree.

Admission to Candidacy Requirements

Students are required to complete an "Application for Admission to Candidacy" due November 1st (for May graduation), September 1st (for December graduation), or May 1st (for August graduation). This form lists all courses to be counted toward the degree. It must be signed by the student and returned to the MPA Program office. The form is available online from the Graduate School web page.

Assistantships

The department offers a number of graduate assistantships each academic year. To apply for an assistantship students must submit a completed "Application for Graduate Assistantship" form and a copy of their resume to the MPA Director. Graduate assistantships are also available in several administrative units on campus. The application form is available online from the Graduate School web page.

Internships

Each student in the Master of Public Administration Program is required to complete a field experience. This requirement may be satisfied in one of these ways: (1) through a position in a public or nonprofit organization; (2) through a position in a business where the work experience is approved for internship by the MPA director; or (3) through an approved internship in a public or nonprofit organization. Each student must complete an "MPA Internship Information" form and submit it to the MPA office for approval. Forms to evaluate the internship experience must also be completed. These forms are available in the main MPA office. Current guidelines for the internship requirement are provided in the MPA Program Handbook.

Track Descriptions

Currently the MPA Program has a concentration in the Management of Nonprofit Organizations. This concentration requires completion of the core MPA courses and MPAD 6187. The nonprofit concentration consists of 15 credit hours within the MPA curriculum (as part of the 40 hours required for the degree). MPAD 6310, Foundations of the Nonprofit Sector; MPAD 6311, Introduction to Nonprofit Management, are required, both for three credits each. Students in this concentration have the option of taking the Directed Study option (MPAD 6800 and MPAD 6801) for three credits each. The focus of the project must be an approved topic in the nonprofit field. Alternatively, nonprofit students may opt to take the MPAD 6188, Research Applications option, for three credits. The focus of the paper in MPAD 6188 must be an approved topic in the nonprofit field. An additional 6 or 9 credit hours from the following courses are also required, depending on which research option was selected:

MPAD6142 Grant and Contract Management in the Public and Nonprofit Sectors (3)
MPAD6320 Strategic Planning for Nonprofit Organizations (1)
MPAD6321 Resource Development in Nonprofit Organizations (1)
MPAD6322 Volunteer Management (1)
MPAD6323 Grant Writing (1)
MPAD6324 Financial Analysis for Government and Nonprofit Organizations (3)
MPAD6325 Legal Aspects of Nonprofit Organizations (1)

Students may petition to take courses from other departments as well.

The program anticipates offering two additional concentrations beginning in Fall, 2005. These include Emergency Management Services, and Urban Management and Policy.

Capstone Experiences

Students are required to complete the following capstone course after successfully completing the comprehensive examination: MPAD 6187, Advanced Seminar in Public Management Problem Solving.

Advising

Each student is assigned an advisor and given access to the MPA Program Handbook when admitted to the program. The advisor is a member of the MPA Program faculty. Students should meet with their advisors each semester to develop a schedule before registering. Students are also encouraged to meet with the Program Director for additional advising when necessary.

Transfer Credit

Up to 6 credits taken at another University can be transferred to the MPA program on the recommendation of the Director and the Dean of the Graduate School.

Comprehensive Examination

Upon completion of the core courses, each student must successfully complete a written comprehensive examination designed to test knowledge and/or skills of administrative analysis and administrative theory and practice. It is the responsibility of the student to take the requisite courses and the comprehensive examination in a timely-fashion. All MPA core courses are offered at least once a year either during the fall, spring or summer semesters. Comprehensive exams are administered twice a year; once in January and again in August. Comprehensive exams must be completed before students can take the capstone course, Directed Study or Research Applications. Furthermore, it is strongly recommended that students take the comprehensive exams prior to elective courses. Students failing the exam

must retake it at the next time the exam is scheduled. Students are allowed only two attempts to pass the comprehensive exams. Failing a second opportunity leads to termination from the program.

Application for Degree
Students are required to file an "Application for Degree" with the Graduate School due October 1st (for May graduation), August 1st (for December graduation), or May 1st (for August graduation). The form is available online from the Graduate School web page.

Research Opportunities/Experiences
Many faculty have grants which help them employ graduate students to aid them in research.

Scholarships
1) The North Carolina City and County Management Association funds a scholarship for an MPA student to help train students for careers in North Carolina local government. The MPA Program selection committee nominates the eligible recipient each fall. 2) Burkhalter Alumni Scholarship. The MPA Alumni Association has established a scholarship fund to honor a former Charlotte City Manager. 3) Brown-Dorton MPA Scholarship. The MPA selection committee nominates eligible recipients to community officials in Concord who determine the winner each fall. 4) Other awards are available on a competitive basis through the Graduate School. 4) Other professional associations occasionally offer scholarships for which MPA students have competed successfully.

Tuition Waivers
Out-of-state tuition waivers are available to students appointed to graduate assistantships. These are awarded on a competitive basis. Partial waivers of in-state tuition are also awarded competitively to students who are residents of North Carolina. A limited number of partial tuition awards are made available through the Graduate School.

Financial Assistance
Other forms of financial aid, such as loans, are available. Students should contact the Financial Aid Office at 704-687-2461 for further information. Several administrative units on campus also employ graduate students.

GRADUATE CERTIFICATE IN NONPROFIT MANAGEMENT

The Graduate Certificate in Nonprofit Management at the University of North Carolina at Charlotte is designed to provide graduate education in nonprofit management for those individuals who are currently serving as managers or volunteers in nonprofit organizations, or those who might want to pursue careers in nonprofit management. The certificate is also intended to serve the interests of students currently enrolled in UNC Charlotte graduate programs.

Admission Requirements
Admission to the Graduate Certificate program in Nonprofit Management is open to graduates of colleges and universities accredited by a regional or general accrediting agency. To apply, the student must meet the following requirements:

1) A completed Graduate Admissions application form and statement of professional goals
2) Two official transcripts from post secondary educational institutions
3) Three letters of recommendation from academic or professional sources
4) An overall GPA of 3.0 on a 4.0 scale

Certificate Requirements
The Graduate Certificate program in Nonprofit Management requires 15 credit hours. The following courses are required:

MPAD6310	Foundations of the Nonprofit Sector (3)
MPAD6311	Introduction to Nonprofit Management (3)
MPAD6324	Financial Analysis for Government and Nonprofit Organizations (3)

An additional six credit hours from the following elective courses are also required:

MPAD6142	Grants and Contract Management in the Public and Nonprofit Sectors (3)
MPAD6320	Strategic Planning for Nonprofit Organizations (1)
MPAD6321	Resource Development in Nonprofit Organizations (1)
MPAD6322	Volunteer Management (1)
MPAD6323	Grant Writing (1)
MPAD6325	Legal Aspects of Nonprofit Organizations (1)

Other electives as approved by the MPA Director and faculty.

Note: Students who have completed the Duke Certificate in Nonprofit Management may be eligible to substitute that for three hours of elective credit.

Courses In Public Administration

MPAD 6000. Topics for Graduate Study in Public Administration. (1-4) Intensive study of a topic in public administration. The topic of investigation may vary from semester to semester. May be repeated for credit. *(On demand) (Evening)*

MPAD 6102. Foundations in Public Administration. (3) Corequisite: Introduction to American Government (or the equivalent). Consideration of the political context of contemporary public administration, with attention to

the role of administration in the policy process, the legal basis for public administration, legislative-executive relations, and accountability and responsibility in democratic administration. *(Fall, Spring) (Evening)*

MPAD 6104. Public Organizations and Management. (3) Changing images of people, organizations and organizational environments; research findings and applications related to organization structure, motivation, leadership, communications, decision-making, group dynamics, interpersonal skills; ethics and values important to the study and practice of organizational leadership; and assessment of value systems and the impact of competing value systems on public and organizational policy making. *(Fall, Spring) (Evening)*

MPAD 6125. Quantitative Research Methods in Public Administration. (3) Corequisite: MPAD 6125L. Prerequisite: elementary statistics or equivalent. Introduction to the use of quantitative analysis in administration. Special emphasis on issues of research design, data collection, elementary statistical analysis, and the interpretation and presentation of research findings. *(Fall, Spring) (Evening)*

MPAD 6125L. Computer Laboratory in Quantitative Research Methods in Public Administration. (1) Corequisite: MPAD 6125. Hands-on computer experience to master the substantive materials taught in Quantitative Research Methods. *(Fall, Spring) (Evening)*

MPAD 6128. Public Policy Analysis and Program Evaluation. (3) Prerequisite: MPAD 6125. Application of analytic tools for decision making in public administration through the practical implementation of the design developed in MPAD 6125. Covers and array of statistical and decision analysis tools commonly encountered in the field. Includes extensive use of computers in the manipulation and analysis of data. *(Fall, Spring) (Evening)*

MPAD 6131. Public Budgeting and Finance. (3) An introduction to the basics of public finance and an examination of the theory and development of public budgeting, the budget processes, the budget cycle, budget reforms, capital budgets, revenue sources, taxation policies and processes, intergovernmental fiscal relations and governmental accounting practices, debt management and cash management in public organizations. *(Spring) (Evening)*

MPAD 6134. Human Resources Management. (3) Corequisite: POLS 1110, Introduction to American Government (or the equivalent). Study of the context of public personnel administration; basic functions of job evaluation and compensation, employee rights and responsibilities; the legal constraints including equal opportunity, health and safety, collective bargaining; government productivity. (Same as HADM 6147) *(Spring) (Evening)*

MPAD 6140. Labor Management Relations in Government. (3) Public employee unionization, collective bargaining, unit determination and recognition; negotiation; third-party process; administration of agreements. *(On demand) (Evening)*

MPAD 6141. Conflict Management in Public Organizations. (3) The role of the administrator as a focal point in social change and the management of the conflict that occurs. Perspectives on the negotiation and bargaining process will be reviewed. *(On demand) (Evening)*

MPAD 6142. Managing Grants and Contracts in the Public & Nonprofit Sectors. (3) Understanding government contracting and practice in government grant proposal writing with the development of contract administration skills. *(On demand) (Evening)*

MPAD 6143. Introduction to Administrative Law. (3) Prerequisite: MPAD 6102 or consent of the instructor. Examines the legal principles governing the modern administrative state, including: the Constitutional status of administrative agencies; legislative, judicial, and executive control of administrative agencies; discretion in making, adjudicating, and enforcing law and policy; the Administrative Procedures Act; and judicial review of agency action. *(On demand) (Evening)*

MPAD 6144. Changing the Public Organization. (3) Overview of concepts and methodologies of organization development, diagnosing organizational needs, change strategies and interventions. *(On demand) (Evening)*

MPAD 6160. Information Systems in Public Administration. (3) Issues involved in administering and managing information system resource activities in public organizations. Topics include the system development life cycle including issues ranging from information system design and development through installation and evaluation. Special emphasis on challenges to achieving improved performance through information technologies in the public sector. *(On demand) (Evening)*

MPAD 6170. Communication Law and Policy. (3) This course is designed for those students with an interest in the law of public communication. Subjects such as First Amendment theory, censorship, hate speech, libel, invasion of privacy, obscenity, indecency, and commercial speech rights will be examined. Through a casebook and lecture approach, students will become well versed in current Constitutional law in these and other areas. No prior legal coursework is required. (Same as COMM 6170) *(On demand) (Evening)*

MPAD 6172. Administration of the Health Care Systems in the United States. (3) Components of the health care system in the United States, with emphasis on the relationships among public (local, state and federal), private, voluntary and nonprofit entities; including points

of access for recipients of health care; relationships with other human services and professions involved in providing health care; and the regulatory environment governing these relationships. (Same as HADM 6100) *(On demand) (Evening)*

MPAD 6174. Public Policy and Politics in Health Care Administration. (3) Prerequisite HADM 6100; MPAD 6172. Examination of the formulation, adoption and implementation of public policy for health care through federal, state and local political processes. (Same as HADM 6142) *(On demand) (Evening)*

MPAD 6176. Trends and Issues in Health Administration. (3) Examination of current issues confronting health care managers and an assessment of current programs and management responses to emerging trends in the health care field, including delivery systems, marketing/competition, strategic planning, financial management and/or epidemiological changes. (Same as HADM 6204) *(On demand) (Evening)*

MPAD 6185. Intergovernmental Relations. (3) Survey of the complex relationships of governments in an urban environment set in the federal system. A review of the problems created by that system and the approaches to their solutions. *(On demand) (Evening)*

MPAD 6187. Advanced Seminar in Public Management Problem Solving. (3) Seminar viewed as a capstone to the student's coursework in public management and is required to be taken by all students. Seminar devoted to topics in public management, which involve problem identification and solution. *Permit Only. (Fall, Spring) (Evening)*

MPAD 6188. Research Applications in Public Administration. (3) Prerequisite: all core courses and passing of comprehensive examination. Preparation of a major paper on a topic of significance in public or nonprofit administration. Topics must be approved by the instructor, and paper drafts will be revised by the student following evaluation by the instructor. Each paper must be well grounded in the appropriate professional literature and must demonstrate competence in professional communication skills. *Permit Only. (Fall, Spring) (Evening)*

MPAD 6210. Aging and Public Policy. (3) Examination of the public policy making process with attention to aging policy. Consideration of determinants of aging policy and institutions and actors in the policy making process and piecemeal development of legislation will be analyzed as factors related to the making of policy for the aged. (Same as GRNT 6210) *(Yearly) (Evenings)*

MPAD 6211. Administration of Aging Programs. (3) Focus will be the implementation of public policies and programs for the aged and the development and administration of these programs. Students will become familiar with the process through which policies are transformed into aging programs and the budgetary, management and evaluative considerations that must be considered. (Same as GRNT 6211) *(Yearly) (Evenings)*

MPAD 6310. Foundation of the Nonprofit Sector. (3) Survey of the history, culture and legal foundation of the nonprofit sector. Key definitions, scope and relationships between the nonprofit, for profit and government sectors are discussed. Examines current policy issues confronting nonprofits. *(Fall)*

MPAD 6311. Introduction to Nonprofit Management. (3) Examination of the structure, function and administration of nonprofit organizations. Developing strategies to insure financial and ethical management. *(Spring)*

MPAD 6320. Strategic Planning for Nonprofit Organizations. (1) Long and short range planning. Developing mission statements, conducting environmental assessments, writing, implementing, evaluating, and revising the plan will be covered. Addresses strategies for incorporating staff, board and community viewpoints. *(On demand)*

MPAD 6321. Resource Development in Nonprofit Organizations. (1) How nonprofit organizations set revenue goals, select fund-raising techniques, allocate personnel and volunteers and evaluate results. How nonprofit organizations should manage their relationships with different funding sources to maximize fund raising potential. *(On demand)*

MPAD 6322. Volunteer Management. (1) Examines the changing role of volunteerism in the nonprofit organization. Topics include developing a strong and diverse volunteer work force and recruiting, screening and placement, orienting, managing, evaluating and recognizing volunteers. *(On demand)*

MPAD 6323. Grant Writing. (1) Topics include conducting prospect research, making initial contacts with funders and preparing, submitting and following up on grant proposals. *(On demand)*

MPAD 6324. Financial Analysis for Government and Nonprofit Organizations. (3) Topics include fund accounting basics for government and nonprofit organizations, preparation and analysis of financial statements, evaluating and monitoring financial condition, capital budgeting and investment analysis, debt policy and management. *(On demand)*

MPAD 6325. Legal Aspects of Nonprofit Organizations. (1) The legal requirements and issues of liability for nonprofit organizations. These include: required financial reports; tax-exempt status; tort liability; and legal responsibilities of boards of directors. *(On demand)*

MPAD 6800. Directed Study in Public Administration. (3) Prerequisite: all core courses and passing of comprehensive examination. Individual project proposal on a directed topic of significance based on field experience in public administration. Pass/In Progress grading. *Permit Only. (Fall, Spring) (Evening)*

MPAD 6801. Directed Study in Public Administration. (3) Prerequisite: MPAD 6800. Individual project report on a directed topic of significance based on field experience in public administration. Pass/In Progress grading. *Permit Only. (Fall, Spring)*

MPAD 6820. Independent Study. (1-3) Prerequisite: consent of the instructor and the MPAD Director. Supervised study of a public administration topic or problem of special interest to the student, within the instructor's expertise, and normally an extension of previous coursework with the instructor. *(Fall, Spring, Summer)*

MPAD 7999. Graduate Residence. (1) Maintains continuous enrollment as required by University policy. *(Fall, Spring, Summer) (Evenings)*

PUBLIC POLICY

Ph.D. in Public Policy

704-687-4520
http://www.uncc.edu/ppol/

Degree

Ph.D./Doctor of Philosophy in Public Policy

Director

Dr. Gerald L. Ingalls, Interim
Department of Geography and Earth Sciences

Graduate Faculty

Criminal Justice
Bruce Arrigo
Beth Bjerregaard
Paul Friday
Vivian Lord
Economics
John Gandar
Benjamin Russo
Peter Schwarz
Jennifer Troyer
Geography and Earth Sciences
Kenneth Chilton
Harrison Campbell
Owen Furuseth
Bill Graves
Edd Hauser
Gerald Ingalls
Ronald Kalafsky
Jiyeong Lee
Tyrel Moore
Heather Smith
Wei-Ning Xiang
Health Behavior and Administration
William McAuley
Lutchmie Nurine
Gerald "Jerry" Pyle
Shirley Travis
History
Gregory Mixon
Management
Beth Rubin
Philosophy
Rosemarie Tong,
Political Science
Theodore Arrington
William Brandon
Ken Godwin
Gary Johnson
Suzanne Leland
Schley Lyons
Tiffany Manuel
Gary Rassel
David Swindell
Richard Waterman
Sociology and Anthropology
Charles Brody
Yang Cao
Scott Fitzgerald
Rosemary Hopcroft
Janet Levy
Roslyn Mickelson
Stephanie Moller
Teresa Scheid
Murray Webster
Joseph Whitmeyer
Diane Zablotsky

PH.D. IN PUBLIC POLICY

The Ph.D. in Public Policy at UNC Charlotte is an interdisciplinary program focusing on the study of urban regional development. It stresses the development of skills, tools, and specialties that contribute to our understanding of the structure of urban/regional systems and sub-systems and of how policy should be shaped within urban regions.

The Ph.D. in Public Policy at UNC Charlotte prepares students to be researchers, decision makers and policy analysts in academia, local, state or federal government and not-for-profit and for-profit institutions. The Program stresses applied and empirical policy research that is grounded in an interdisciplinary theoretical foundation. Students will become versed in analytical

techniques suitable for research and policy analysis to address substantive issues and problems in the context of urban regions. The intellectual focus of the Program is guided by three overarching themes: (1) Interdisciplinary Perspective: Effective policy analysis and policy formation are not informed by any single discipline. Rather, public policy requires knowledge of the historical, cultural, political, institutional, geographic, and economic dimensions of urban places. (2) Applied and Empirical Policy Analysis: Public policy is an inherently applied endeavor that seeks practical solutions and cogent analysis. While all research and analysis is informed by theory, the purpose of policy research is to elevate public discourse and improve public decision-making. (3) Place-Based Research: To exercise applied policy analysis in an interdisciplinary context, policy research must be place-based. Real policy analysis, based on real data, applied to actual urban settings is a strength of the Program.

Admission Requirements

The following are general guidelines for successful admissions into the Ph.D. in Public Policy:

1) A master's degree in a social science or other field related to policy studies is required for admission to full standing in the Ph.D. in Public Policy.
2) Exceptional performance at the master's level is required. This means a GPA of at least 3.3 in a master's degree program is required for admission. Students with baccalaureate degrees may be admitted on a conditional basis if they have an overall undergraduate GPA of at least 3.2 and are currently enrolled in a master's level program at UNC Charlotte in a field related to policy studies. But such students will not formally be admitted to the Ph.D. program until completion of the requirements for the master's degree.
3) Admission to the program will require strong scores on the verbal, quantitative, and analytic sections of the Graduate Record Examination. The Graduate Record Examination is a required part of the application package.
4) Three strong, positive letters of recommendation, at least two of which must come from faculty in the student's previous academic programs. All letters should be written by individuals in a position to judge the applicant's likely success in a Ph.D. level program. Letters should address the applicant's suitability for a Ph.D. program and ability to complete the program in a timely fashion. Letters from the student's master's level program are preferred.
5) Admission to the program of students who are not native English speakers will require strong scores on the TOEFL exam. The TOEFL exam is a required part of the application package for non-native English speakers.
6) Students entering the program will be expected to remedy any course work deficiencies identified by their advisory committee in the first semester after enrolling in the program. The amount and kinds of remedial course work required for the program will depend on the background of the student and will be established by the Graduate Admissions Committee and the student's advisory committee. Possible deficiencies are indicated in the prerequisites for the required core courses of the program. However, it is important to note that this program will emphasize the quantitative and analytical skills necessary to confront the challenges of urban and regional growth and development.

Documents to be submitted for application for admission:

1) Official transcripts from all colleges and universities attended
2) Official GRE scores (verbal, quantitative, and analytical)
3) The UNC Charlotte application for graduate admission form
4) Three letters of reference from academics who have taught or worked directly with the applicant.
5) An essay that addresses professional goals and motivation for pursuing the degree, suitability for the program, career goals following the degree, and the policy specialty the applicant would pursue within the Program.
6) TOEFL scores (if the student is not a native English speaker)

Admission Assessment

1) An Admissions Committee will review applications and recommend to the Program Director whether each applicant should be admitted and, if so, under what conditions.
2) The Program's Admissions Committee will assess each student's previous academic coursework in light of the student's stated direction of study. This assessment will be used to identify the strengths and weaknesses of the student's previous academic history and to suggest specific course work for the student's public policy program. Any remedial course work required for the program will depend on the student's background and will be established by the Admissions Committee and confirmed by the Program Director. The Admissions Committee may also suggest specific coursework based on the student's intended direction of study within the program. The Admissions Committee will conduct this assessment upon the student's acceptance and formal declaration of intent to attend. For each entering student, a member of the Public Policy Faculty will be selected to serve as his or her major advisor for the first year in the Program.

Student Responsibility

Students entering the program must present evidence that their background is sufficient to undertake the coursework required of them. Such evidence must include:

1) familiarity with political and legal processes, behaviors, and institutions;
2) familiarity with the nature of urban regions;
3) a graduate level social science methods or statistics course;
4) college course work in both macro- and micro-economics;
5) a course in Geographic Information Systems (GIS); and
6) substantial background in a public policy specialty area.

Students may have completed appropriate courses to provide this background elsewhere. Normally, transcripts will provide the evidence required by the Admissions Committee. However, if the student's previous experience is offered as evidence, the student must document such experience. A more detailed list of the types of pre-requisite coursework can be found on the Program's website.

Admission to Candidacy Requirements

After completing the core courses, students will be required to write a qualifying exam covering the nature of the field, methodology, and applied skills. After completing the core examination, students will be required to write a comprehensive exam covering their area of specialty expertise. Successful completion of both core and specialty examinations allows students to proceed to the dissertation proposal preparation and defense stage.

Assistantships

The Ph.D. in Public Policy is committed to year around funding for all fulltime students. Available options for funding include graduate assistantships, full and partial tuition waivers and scholarships. For more information on funding options contact Dr. Gerald Ingalls, Director, Ph.D. in Public Policy.

Tuition Waivers

A limited number of out-of-state tuition waivers are available for the qualified students.

Degree Requirements

The total number of hours will be established by the student's advisory committee according to a plan of study that must be presented after the successful completion of 18 hours of coursework. However, the Ph.D. Program requires: 30 hours of core course credit, 18 hours of dissertation credit (enrollment contingent on admission to candidacy) and a minimum of 15 hours credit for specialty electives. It is unlikely that students will be able to complete this degree, including mastery of a subject-matter specialty, in 65 hours; 70 - 75 hours is a more likely norm.

Core Courses:

The Ph.D. program requires 30 hours of core course credit.

The Nature of the Field

PPOL8600 Policy Process I
PPOL8602 Research Design
PPOL8635 Ethics of Public Policy
PPOL8690 Seminar in Public Policy*

Methods of Analysis

PPOL8620 Quantitative Analysis I
PPOL8621 Quantitative Analysis II
PPOL8622 Qualitative Analysis
PPOL8630 Advanced Program Evaluation

Economic Analysis

PPOL8640 Economic Analysis I
PPOL8641 Economic Analysis II
PPOL8801 Dissertation

* PPOL8690 is a one credit hour course. Students must enroll in it three separate times.

Track Descriptions

In addition to completing 30 core course hours and 18 hours of dissertation, the student is expected to have broad knowledge of a relevant subject matter specialty. Students are required to complete a minimum of 5 classes in a coherent specialty area. The Public Policy Ph.D. program has the following specialty areas: health policy, social policy, urban regional development, criminal justice policy, and environment/infrastructure policy. A student may design a program of study with a different focus by combining classes in several of these specialty areas with the approval of the student's advisor and the Program Director. While the particular courses required in each specialty area may vary according to pre-requisites needed by the student or individual programs of study, the minimum number of required courses in any given specialty area is 5 for 15 credit hours.

Urban Regional Development and Infrastructure

The Urban & Regional Development Specialization stresses applied and empirical policy research that is grounded in an interdisciplinary theoretical foundation. Students will be prepared in analytical techniques suitable for research and policy analysis through courses addressing several topics at the neighborhood, city and regional levels, including: Economic Development; Transportation Policy; Infrastructure Provision ; Public Service Delivery ; Growth Management ; Regionalism and Governance

Required courses for this specialty include:

PPOL8610 Urban Regional Environment
PPOL8611 Metropolitan Governance and Administration
PPOL8613 Transportation Policy

Two Additional Courses from These Choices:

PPOL8612 Theory of Urban Development
PPOL8614 Colloquium in 20th Century Black Urban History
PPOL8615 The Restructuring City
PPOL8616 Urban Planning Theory and Practice
PPOL8617 Law and Management
PPOL8618 Growth Management Systems
PPOL8642 Regional Economic Development
PPOL8643 Rural Development Issues
PPOL8644 Public Budgeting and Financing

Environmental Policy

The Specialization in Environmental Policy focuses on environmental issues impacted by energy production and consumption, growth, pollution, and population change. This specialty allows interested students to gain knowledge on the economic factors related to environmental degradation and improvement. It also allows them the opportunity to become familiar with the scientific aspects of urban air, water, and earth systems. Policy making and policy analysis related to these issues will all be covered by courses in this specialty.

Required courses for this specialty include:

PPOL8613 Transportation Policy
PPOL8650 Environmental Policy
PPOL8652 Energy and Environmental Economics

Select two additional classes from the list below:

PPOL8653 Urban Air Quality
PPOL8655 Watershed Science and Policy
PPOL8656 Earth Systems Analysis: Biogeochemical cycles

Health Policy

The Specialization in Health Policy focuses on applied research in the organization, delivery and financing of health care and population-based issues in health (including mental health). A multidisciplinary faculty in epidemiology, health economics and finance, health policy, medical sociology, bioethics, and health law is ideally suited to prepare quantitative health service researchers and health policy analysts. Qualified students without a relevant Master's degree can prepare for the Ph.D. by completing coursework in the masters in health administration (MHA), the MA in medical sociology, or the MS in Health Promotion while enrolled in the PhD with a Specialization in Health Policy.

Required courses for this specialty include:

PPOL8661 Social Organization of Health Care
PPOL8663 Health Policy
PPOL8665 Analytic Epidemiology
PPOL8667 Economics of Health and Health Care
PPOL8669 Investigating Health and Health Services

Justice Policy

The Justice Specialization provides an interdisciplinary approach to the study of crime and society's response to it. This concentration prepares students to conduct research and policy analysis on local, state, and national policies and policy initiatives and provide information for policy makers. The primary goal of this specialization is to provide students with the tools necessary for critically and objectively assessing policies related to the administration of justice. Toward that end, students gain the appropriate analytical skills, an understanding of the nature of criminal behavior and its impact, and knowledge about the criminal justice system as well as about a variety of issues related to the control of crime. They also become familiar with the process of making and implementing justice policy and with those organizations involved in this process.

Required courses for this specialty include:

PPOL8671 Criminal Justice Policy
PPOL8672 Theories of Crime and Justice
PPOL8673 Law and Social Control
PPOL8681 Race, Gender, Class and Public Policy
One other class from the other specialties

Social Policy

The Specialization in Social Policy prepares scholars, researchers, practitioners, and policy makers to address crucial social issues facing communities and our nation including social welfare, education, poverty, housing and homelessness and the role of public, nonprofit, and private sectors in alleviating and contributing to such problems. In addition to dealing with these topics in their own right, the social policy specialization focuses on the complex interrelationships among these issues and the manner in which they are influenced by--and in turn influence--prevailing patterns of racial, ethnic, and gender stratification. The social policy specialization provides the theoretical background, methodological training, and substantive knowledge that will allow students to make important contributions to the development, implementation, and evaluation of public policies addressing these most vexing and important social issues of our time.

Required courses for this specialty include:

PPOL8681 Race, Gender, Class and Public Policy
PPOL8682 Stratification and Social Policy
PPOL8683 Population Dynamics and Social Policy

The student needs to select two additional classes from the list below:

PPOL8685 Aging and Social Policy
PPOL8687 Education Policy
PPOL8688 Political Economy & School Reform
PPOL8689 The Social Context of Schooling

Students may also develop a focus in other related fields or design their specialty based on faculty resources available. As with all programs, such a program would need the approval of the student's advisor and the Director of the Program. Program faculty will continue to develop additional substantive and methods courses.

Advising/Committees
Students will be assigned to an advisor soon after enrolling in the Program and will work closely with that advisor on suggested schedules of classes, research options, and other issues important to success. Students will be responsible for forming their dissertation committees. Following completion of the comprehensive and qualifying examinations, students will choose a dissertation advisor and form a dissertation committee.

Grades Required
A student must maintain a cumulative average of 3.0 in all course work taken for graduate credit. An accumulation of two C grades will result in termination of the student's enrollment in the graduate program. If a student receives a grade of U in any course, enrollment in the program will be terminated.

Transfer Credit
The Program will accept up to two courses in the core curriculum as transfer credit from other regionally accredited doctoral institutions, providing that the Admissions Committee determines that these courses are equivalent to those offered in the core or one of the specialty areas. The acceptance of transfer credit is subject to the approval of the Graduate School. The grade in these transfer credits must have been A or B. All of the dissertation work must be completed at UNC Charlotte.

Language Requirement
There is no foreign language requirement.

Dissertation
The program requires that the student complete 18 hours of dissertation credit. Enrollment in dissertation credit is contingent on admission to candidacy. The dissertation topic may be proposed after the student has passed the qualifying and comprehensive exams. The doctoral student advances to candidacy after the dissertation proposal has been defended to, and approved by, the student's advisory committee and reported to the Director of the Ph.D. in Public Policy and the Dean of the Graduate School. The student must complete and defend the dissertation based on a research program approved by the student's dissertation committee that results in a high quality, original, and substantial piece of research.

Other Requirements
Public Policy Seminar Series. Students in the Program will develop their appreciation of the varied nature of policy applications and improve their communications skills by participating in at least three seminar series throughout the course of their program. Each term a series of guest speakers will prepare monthly seminars reflecting a range of policy issues and challenges.

Research Opportunities
The Ph.D. Program in Public Policy has an extensive pool of professors to enhance the research opportunities and experiences for the students. Each program of study could be individually tailored for the research of the student with the possibility of individual studies under the supervision of an advisor.

Application for Degree
Students must apply for the degree when they are close to completing the Program. After successful defense of the dissertation, a student will be conferred with the doctoral degree.

Residency Requirement
Students must satisfy the residency requirement for the program by completing 21 hours of continuous enrollment, either as course work or dissertation credits. Residence is considered continuous if the student is enrolled in one or more courses in successive semesters until 21 hours are earned. All 18 hours of dissertation credit must be earned at UNC Charlotte.

Time Limits for Completion
The student must achieve admission to candidacy within six years after admission to the program. All requirements for the degree must be completed within eight years after first registration as a doctoral student. These time limits are maximums; full-time students will typically be expected to complete the degree requirements in five years.

Courses in Public Policy

PPOL 8000. Topics in Public Policy. (1-4) Pre-requisites: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Study of selected topics in Public Policy. Maybe repeated for credit. *(On Demand)*

PPOL 8600. Policy Process I. (3) Prerequisites: Prior course work or experience relevant to political and legal processes, behaviors, and institutions. Examination of the field of public policy analysis to include both theory and practice. Process includes everything from sources of public problems to feedback mechanisms after policy implementation. Emphasis on the policy process in growing urban regions and the ability to communicate with stakeholders to determine value conflicts and to communicate policy solutions. Examination of the context (legal, institutional, historical, philosophical, social, political, physical and spatial) within which policy is made with sensitivity to gender, race and ethnicity, and class concerns. *(Fall)*

PPOL 8601. Policy Process II. (3) Pre-requisite: PPOL 8600. Continuation of Policy Process I. Includes more specific application of theory to specific public problems

in a variety of specialties, and the variation in communication problems that arise in these sub-systems. Emphasis on interaction of all aspects of urban regions, which produce public problems and determine which policies will be acceptable and effective. *(Spring)*

PPOL 8602. Research Design in Public Policy. (3) Introduces students to various quantitative and qualitative approaches to doing policy research. Considers such major issues in philosophy of science as causality, measurement, and post-positive approaches to research. Students may use the course to prepare their dissertation proposals or research grant and contract proposals. Students should have completed at least two quantitative analysis courses and one qualitative analysis course before registering for PPOl 8602. *(Spring)*

PPOL 8610. Urban Regional Environment. (3) Prerequisite: Prior course work or experience relevant to the nature of urban regions. Examination of the nature of urban regions. The basic factors that shape urban regions as they grow. Impact of: geography; history; social factors; economic factors; concerns about gender, race and ethnicity, and class; and other determinants of the nature of urban regions, their problems, and possible policy solutions. *(Fall)*

PPOL 8611. Metropolitan governance and administration. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Introduction of major issues in urban politics and related trends and problems in urban governance and administration. *(Spring)*

PPOL 8612. Theory of Urban Development. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Analysis of urban economics and politics within the context of public policy and planning. Focuses on theory and application to understand the rationale for and effects of urban policy, urban economic development, and planning. Provides basic understanding of the operation of urban real estate markets and the motivation for public sector interventions. Applies theoretical foundations to the study of current urban problems and controversies. Familiarity with introductory microeconomics is required. *(Fall)*

PPOL 8613. Transportation Policy. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the instructor. This course examines surface transportation from a broad public policy perspective with a special focus on its institutional components and the changing role of government in transportation policy-making including the evolution of, and relationships among, various federal, state and local policies that affect investment decisions in transportation infrastructure. *(On demand)*

PPOL 8614. Colloquium in 20th Century Black Urban History. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Examination of major and topical monographic works in African-American urban history during the twentieth century. The focus will be on such topics as" classical urban examinations by black scholars, ghettoization and alternative theories, community and its institutions, riot sand urban rebellions, biography, black mayors, and urban policy. *(Fall as needed)*

PPOL 8615. The Restructuring City. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course places at center stage the causes and consequences of contemporary urban restructuring and evaluates the theoretical, planning, and policy challenges inevitably presented. *(Spring)*

PPOL 8616. Urban Planning Theory and Practice. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Alternative planning theories and application of theories in urban planning practices. *(Alternate years)*

PPOL 8617. Law and Management. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Constitutional and administrative law issues, including a survey of academic debates over contested issues, and selected areas in constitutional law on civil liberties and civil rights. *(Spring)*

PPOL 8618. Growth Management Systems. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Exploration of growth management programs, legal and planning issues, and legislation to determine their merits, weaknesses and abilities to promote more sustainable development patterns. Will emphasize difficulty of changing traditional procedures of development and land use. *(On demand)*

PPOL 8620. Quantitative Methods in Public Policy I. (3) Prerequisite: graduate level social science methods or statistics course. Advanced quantitative methods as applied to analysis and solution of public problems. Use of quantitative methods to analyze public problems; devise appropriate, effective, acceptable public policies; evaluate public programs; and present the results of quantitative analysis to appropriate audiences. *(Fall)*

PPOL 8621. Quantitative Methods in Public Policy II. (3) Prerequisite: PPOL 8620, Quantitative Methods in Public Policy I. Advanced quantitative methods as applied to analysis and solution of public problems. Use of quantitative methods to analyze public problems; to devise appropriate, effective, acceptable public policies; to evaluate public programs; and to present the results of quantitative analysis to appropriate audiences. *(Spring)*

PPOL 8622. Qualitative Methods in Public Policy. (3) Advanced qualitative methods as applied to analysis and solution of public problems. Use of qualitative methods to analyze public problems, devise appropriate, effective, and acceptable public policies; evaluate public programs; and present the results of qualitative analysis to appropriate audiences. *(Spring)*

PPOL 8625. Advanced Seminar in Spatial Decisions Support Systems . (3) Pre-requisite: GEOG 5120 or consent of the Instructor. Theoretical aspects of spatial DSS including technical, social, political and psychological considerations; system s design; systems manipulation; and case studies. Three hours of lecture and one-two hour lab per week. *(Fall)*

PPOL 8630. Advanced Program Evaluation. (3) Development and application of policy analysis to the evaluation of existing public policies. Particular attention to the use of multiple techniques of analysis and presentation of program evaluations to relevant audiences. *(Fall)*

PPOL 8635. Ethics of Public Policy. (3) Ethical questions in the study, formation, implementation, and evaluation of public policies. Ethical dilemmas faced by the public policy analyst, and the importance of use of values analysis. Emphasis on understanding how values are communicated by a variety of stakeholders in policy systems and how communicating public policy solutions involves an understanding of the role of values in successful policy formation and implementation. *(Spring)*

PPOL 8640. Economic Analysis of Public Policy I. (3) Economic role of government, efficiency versus equity, externalities, and public goods, market failures and government failures, economics of centralized versus decentralized decision making, public choice theory, economics of privatization, economic role of non-profits and non-governmental organizations. *(Fall)*

PPOL 8641. Economic Analysis of Public Policy II. (3) Prerequisite: PPOL 8640. Economics of taxation and government borrowing, benefit-cost analysis, regional growth and development, econometric analysis of local and regional public policy issues. *(Spring)*

PPOL 8642. Regional Economic Development. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy; PPOL 8610; Intermediate microeconomics; or permission of the Instructor. Course covers classical, neo-classical and contemporary theories of trade, economic geography, and regional development. Topics include theories of urban and regional growth, location theories, human capital, labor force and entrepreneurial contributions to growth. Policy dimensions of urban growth and development are addressed from theoretical and empirical perspectives. *(Fall)*

PPOL 8643. Rural Development Issues. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course provides research experiences that focus on policy formulation, and demographic, economic and planning issues in rural areas. *(Fall)*

PPOL 8644. Public Budgeting and Financing. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Focus is on the public budget process as a means of policy development, analysis and implementation. It will also address in more depth issues of financing the policies authorized in the budget and for which appropriations are sought. *(Spring)*

PPOL 8650. Environmental Policy. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course draws upon concepts and tools from economics, geography, law, sociology, political science, and planning to explore the concept of sustainable development, a central tenet of environmental policy. Environmental policy will be analyzed within the federalist framework. *(On demand)*

PPOL 8652. Energy and Environmental Economics. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Economics issues of both energy and environment. Energy issues include the historical development of energy resources, supply and demand considerations, and projections of the future energy balance. Environmental issues are externalities, common property resources, and government regulation. Policy considerations include environmental standards, pollution charges, and property rights. Cost-benefit analysis and microeconomic theory are applied. *(On demand)*

PPOL 8653. Urban Air Quality. (3) Pre-requisites: Ph.D. student and permission of instructor. Examination of the relationships between climatic processes and urban air quality with emphasis on trends and patterns. Topics will include health and environmental effects of air pollution, ozone climatology, pollutant transport, transportation related emissions, risk assessment, and air quality management. *(Fall)*

PPOL 8655. Watershed Science Policy. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Examination of the cycling of water and chemical elements within forested, agricultural and urbanized watersheds. Land use regulations designed to protect water quality are examined with respect to hydrologic and biogeochemical process that operate at the watershed scale. *(On demand)*

PPOL 8656. Earth Systems Analysis: Biogeochemical Cycles. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course examines the Earth's water and major

elemental cycles including those of carbon, nitrogen, sulfur, phosphorus and the major crustal elements. Uncertainties in the current state of global elemental cycles are examined. Special emphasis is placed on how these cycles are currently being modified through human activities. *(On demand)*

PPOL 8661. Social Organization of Health Care. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Focuses on the structures and operations of health care institutions and providers. The topics covered include the socio-historical development of the existing health care system, health care occupations and professions, professional power and autonomy, professional socialization, inter-professional and provider-client relations, health care organizations, and how change affects the delivery of health care services. *(Summer)*

PPOL 8663. Health Policy. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy and a graduate level course providing an adequate introduction to the U.S. health care system such as HADM 6112, MPAD 6172, HPKD 8112 or permission of the Instructor. This doctoral seminar examines the formulation, adoption, implementation, and evaluation of health policy at national, state, and local levels through extensive readings in relevant health and policy literatures. *(Spring)*

PPOL 8665. Analytic Epidemiology. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy and a graduate level courses such as HPKD 6189 and HADM 6103 or permission of the Instructor. Principles and methods of studying advanced epidemiology, with emphasis on analytical approach. Includes advanced techniques in the establishment of disease causation in groups and communities. Such topics as risk assessment, environmental exposures, stratification and adjustment, and multivariate analysis in epidemiology are covered. (Fall)

PPOL 8667. Economic of Health and Health Care. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy, PPOL 8640 and PPOL 8641 or permission of the Instructor. This course will use economic theory and econometrics to analyze the functioning of the health care sector and appropriate public policy. Topics will include: how markets for medical care differs from other markets, the demand for medical care, the demand and supply of health insurance, the role of competition in medical markets, managed care, managed competition, and the role of the public sector in regulating and financing health care. *(Fall)*

PPOL 8669. Investigating Health and Health Services. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy and PPOL 8620 and PPOL 8621 or permission of the Instructor. The emphasis of this course is how to conduct and evaluate research necessary to health policy. Students will be expected to conduct research utilizing a variety of methodologies and will also learn how to access available secondary data sets relevant to health care and policy. The specific topics include: multidisciplinary collaboration, measurement of health related constructs and health care outcomes, and health evaluation (cost, quality, access). Students will be expected to develop their dissertation proposals as one outcomes of this class. This class is designed to be a seminar, and active participation in class discussion and activities is essential. *(Fall)*

PPOL 8671. Criminal Justice. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Examination of the criminal justice subsystems (law enforcement, courts, corrections) with particular focus on the development of policy and the effectiveness of current policies aimed at reducing crime. *(Fall)*

PPOL 8672. Theories of Crime and Justice. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course is designed to expose students to mainstream and critical theoretical approaches to crime, justice, and criminal behavior. An emphasis on both broad conceptual orientations allows us to assess the development of criminology within an array of historical and philosophical contexts during the past three centuries. *(On demand)*

PPOL 8673. Law and Social Control. (3) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Examines how the criminal law functions as a powerful tool of social control in our society. Particular emphasis is given to understanding the constitutional limitations placed on construction of law, the elements of criminal offenses, and criminal defenses. *(Spring)*

PPOL 8681. Race, Gender, Class and Public Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course is designed as an overview of major theories, trends and debates on the topic of gender, race and economic inequality in the contemporary United States. *(On demand)*

PPOL 8682. Stratification and Social Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course examines (a) structures and processes underlying social stratification in the United States, particularly the inequality that is grounded in social class, gender, ethnicity, and race; and (b) the social policy implications that follow from our analysis of the nature and sources of stratification. *(On demand)*

PPOL 8683. Population Dynamics and Social Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Basic

population characteristics, such as age distribution, life expectancy, fertility, and trends in these characteristics are relevant to nearly all social policy. This class is an introduction to basic concepts and tools of demographic analysis and how they may be applied to the study of social policy including family policy, aging policy, and minority groups' policy. *(On demand)*

PPOL 8685. Aging and Social Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course is designed to utilize the concepts of social gerontology as a Springboard for examining social policy for an aging population. Examination of the public policy making process with attention to aging policy. Consideration of determinants of aging policy and institution and actors in the policy making process and piecemeal development of legislation will be analyzed as factors related to the making of policy for the aged. *(On demand)*

PPOL 8687. Education Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course examines equity, efficiency, and diversity tradeoffs among alternatives systems of delivering K-12 education. The course also examines how to evaluate educational policies and programs. *(On demand)*

PPOL 8688. Political Economy of School Reform. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course examines between business leaders' vision for school reform and the school restructuring movement, the reforms which arise from their construction of the problem, local educational restructuring efforts within the context of the larger national reform movement, and the opportunities and dangers of corporate-inspired educational policies. *(On demand)*

PPOL 8689. The Social Context of Schooling. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. The purpose of this course is to examine the relationships among certain aspects of the contemporary social structure and educational processes and outcomes. It explores the ways that the social class structure, race, and gender stratification affect the ways individuals experience, understand, and acquire education. *(On demand)*

PPOL 8690. Seminar in Public Policy. (1) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Series of guest speakers giving monthly seminars on a range of policy issues. Designed to increase familiarity with the variety of topics and methods covered by policy making and analysis. Student participation and oral critique of a selected speaker and their topic. *(Fall/Spring)*

PPOL 8800. Independent Study in Public Policy. (1-6) Pre-requisite: Full graduate standing in the Ph.D. in Public Policy and the permission of the Instructor. *(On demand)*

PPOL 8801. Dissertation. (1-9) Prerequisite: passage of qualifying examinations, and approval of dissertation topic by the student's advisory committee. In-depth study of a practical problem in public policy. Analysis of the problem, preparation of a policy solution, and presentation of the solution to appropriate stakeholders and the public. Pass/no credit grading. Maximum of 18 hours allowed under this course designation. *(Fall, Spring, Summer)*

PPOL 8802. Dissertation Residence. (1) Prerequisite: completed enrollment in 18 hours of dissertation with grade of IP, In Progress. This course is to allow a student who has taken all permissible 18 hours of dissertation to remain in residence to finish work on the dissertation. Pass/no credit grading. Credit for this course does not count toward the degree. *(Fall, Spring)*

Changes to the core or the specialty area courses can be found on the Program's website:
http://www.uncc.edu/ppol/
or at the Graduate School website
http://www.uncc.edu/gradmiss/

Notes on course frequency and prerequisites:

1) The core courses listed above are available only to students admitted into the Ph.D. in Public Policy or to students admitted to other Ph.D. programs.
2) Consent of the instructor is required on all classes in the Public Policy Ph.D.
3) There are no specific prerequisites for many of the courses listed above; however the general levels of preparation are described in greater detail on the program's website.

Many of these courses will be offered during one of the summer sessions as well as during the semester specified in the course description.

RELIGIOUS STUDIES

Department of Religious Studies

210 Macy Building
(704) 687-4598
http://www.religiousstudies.uncc.edu

Degree

M.A.

Coordinator

Dr. John C. Reeves

Graduate Faculty

Ann Burlein, Assistant Professor
Richard A. Cohen, Professor

Kathryn Johnson, Associate Professor
Sean McCloud, Assistant Professor
Jeffrey F. Meyer, Professor
John C. Reeves, Professor
Jeremy Schott, Assistant Professor
Joanne Maguire Robinson, Associate Professor
James D. Tabor, Professor
J. Daniel White, Associate Professor

MASTER OF ARTS IN RELIGIOUS STUDIES

The program approaches the academic study of religion and religions from a variety of critical and interdisciplinary perspectives, with an emphasis placed on the global and multicultural aspects of religion. The department offers courses in Asian, Middle Eastern, European, and American religious traditions which focus on aspects of both their historical and contemporary manifestations.

Additional Admission Requirements

In addition to meeting the university's graduate admission requirements, all prospective students must submit an essay (statement of purpose) that specifically addresses their motivation for pursuing the M.A. in Religious Studies, including some discussion of their research interests and career or professional goals. Standardized test scores and letters of reference can be no more than five years old.

Degree Requirements

The Master of Arts in Religious Studies requires the completion, with a GPA of 3.0 or better, of a minimum of 30 semester hours of approved graduate course work. At least 15 hours of this total must be in courses open only to graduate students (i.e., at the 6000 level or higher). Upon the completion of 24 hours of course work, students must pass a comprehensive written examination based on their studies. Students have the option of writing a thesis (6 semester hours credit) or of compiling a portfolio of selected research papers written for courses in the program (no additional credit). In either case the candidates must pass an oral examination based on their thesis or writing portfolio. Students completing a thesis may take 6 hours of thesis preparation (RELS 6999) toward their 30 hours. All degree requirements, including the comprehensive examination, thesis or portfolio, and oral defense, must be completed within six calendar years of first enrollment in the program.

Core Courses

All M.A. candidates must complete RELS 6101 (Approaches to the Study of Religion), normally during their first semester of course work, with a grade of B (3.0) or better.

Elective Courses

Up to 6 semester hours of related graduate credit may be earned outside the Department of Religious Studies. Such courses must be formally approved by the director of graduate studies.

Admission to Candidacy Requirements

An Admission to Candidacy form is normally filed upon the completion of 24 hours of course work.

Advising

The director of graduate studies serves as formal advisor to the graduate students.

Transfer Credit

Up to 6 semester hours earned from other accredited institutions may be eligible for transfer credit. Formal approval must be obtained from the director of graduate studies and the Dean of the Graduate School.

Language Requirement

Although students are not required to demonstrate proficiency in a foreign language as a formal matriculation requirement of the program, they are expected to acquire competency in and use whatever languages they need to pursue their research interests.

Comprehensive Examination

Every student must satisfactorily complete a comprehensive written examination upon the conclusion of their coursework. This examination is normally taken during the third or fourth semester (for full-time students). Students who elect to write a thesis become eligible for the comprehensive examination after completing 24 hours of course work; all others become eligible after completing 30 hours of course work.

Committees

Three-member faculty committees, consisting of two graduate faculty members from the Department of Religious Studies and a third member selected from Religious Studies or another department, conduct the comprehensive examinations and oversee the student's thesis work.

Thesis

Students have the option of writing a thesis (6 semester hours credit) or of compiling a portfolio of selected research papers written for courses in the program (no additional credit). In either case the candidates must complete an oral examination based on their thesis or writing portfolio.

Application for Degree

The Application for Degree is submitted on the form supplied by the Graduate School no later than the deadline specified in the University calendar.

Courses in Religious Studies

RELS 5000. Topics in Religious Studies. (3) Prerequisite: consent of the instructor. May be repeated for credit. *(On demand)*

RELS 5010. Major Figure in Religious Studies. (3) The life and works of a major figure who has contributed to religious studies. May be repeated for credit for different figures. *(On demand)*

RELS 5101. Religion and Modern Thought. (3) The interaction of modern thought and modern religious sensibilities. *(Alternate years)*

RELS 5107. Early Judaism. (3) Prerequisite: RELS 2104 or 2105 or 3110 or consent of the instructor. Comparative historical and literary study of the varieties of Judaism evidenced during late antiquity (circa 70-640 C.E.), with special attention devoted to the formation and development of rabbinic Judaism. *(On demand)*

RELS 5108. Medieval Judaism. (3) Prerequisite: RELS 2104 or 3110 or consent of the instructor. Comparative historical and literary study of the varieties of Judaism evidenced in Western Europe, the Byzantine Empire, and Islamicate realms from approximately 640 C.E. to approximately 1492 C.E. *(On demand)*

RELS 5109. Modern Judaism. (3) Prerequisites: RELS 3110 or 4107 or 4108 or permission of the instructor. Historical and conceptual study of Judaism and Jewish experience in Europe, America, and Israel, from the 16th century to the present, with special attention paid to the development of denominations, Zionism, and the Holocaust. *(On demand)*

RELS 5110. Contemporary Jewish Thought. (3) An examination of philosophy, religion, morality, politics, sociality, culture, family, and self-identity, in the light of modern and recent Jewish thought. *(Alternate years)*

RELS 5201. Religion, Morality, and Justice. (3) Explores the ethical and social dimensions of selected religious traditions in their cultural contexts. *(On demand)*

RELS 6000. Topics in Religious Studies. (3) Prerequisite: consent of the instructor. May be repeated for credit. *(On demand)*

RELS 6101. Approaches to the Study of Religion. (3) This course provides students with critical tools for research, analytical thinking, and writing in the academic study of religion. The topics and individuals this course covers represent several major currents of thought in the field of religious studies. *(Fall)*

RELS 6103. Material Christianity. (3) Explores the ways in which individuals and societies throughout the Christian tradition have invested material objects with sanctity and power. *(Alternate years)*

RELS 6104. Religion and Art in Islam. (3) Explores the relationships between Islamic thought and the development of Islamic art and architecture. *(Alternate years)*

RELS 6105. Religion, Art and Architecture of East Asia. (3) A study of the religious ideas in physical forms in the cultures of China and Japan. The course focuses on the Confucian, Daoist, and Buddhist traditions. *(Alternate years)*

RELS 6111. Qumran and its Literature. (3) A study of the manuscripts recovered from the caves of Qumran. Attention given to their connections to Second Temple Judaism, early Christianity, and later developments in Islam. *(Alternate years)*

RELS 6602. Seminar in the Religion of Ancient Israel. (3) Current and seminal issues related to the study of the religion of ancient Israel. A general theme will be chosen which at times will be keyed to the pertinent archaeological evidence available for evaluating the complex scope of Israelite religiosity, but which at other times may selectively focus on narratological descriptions of religious behavior (e.g., the religious ideology of Deuteronomy). Extensive attention will be devoted to the comparative study of Israelite religion within its ancient Near Eastern context. *(On demand)*

RELS 6603. Seminar in Early Judaism. (3) Current and seminal issues related to the historical-critical study of early Judaism and its literature. A general theme will be chosen: a narrative source (Mishnah, Midrash, Talmud); a subdivision of texts (Jewish apocrypha and pseudepigrapha) or literary genres (apocalyptic literature); a single ancient text (1 Enoch; Avot de R. Natan); or a topical investigation (written and oral Torah; construction of authority in rabbinic Judaism; sectarian disputes within early Judaism; cultural impact of the Roman destruction of the Temple). *(On demand)*

RELS 6612. Seminar in Christian Origins. (3) Current and seminal issues related to the historical-critical study of the origins and development of earliest Christianity. A general theme will be chosen: an historical figure (John the Baptist, Jesus, Paul, James); an ancient text (a New Testament document; Gospel of Thomas; the Gnostic Nag Hammadi codices); or a topical investigation (Jesus and the Dead Sea Scrolls; the development of early Christian liturgy; the development of early Christian Christology; ancient Judaism and emerging Christianity). *(On demand)*

RELS 6622. Seminar in Religion and Modern Culture. (3) A seminar on issues related to the historical-critical study of the interaction between religion and modern culture. One or more general themes will be

chosen: leading theorists, appropriate historical contexts, global contexts, or a topical investigation. *(Yearly)*

RELS 6800. Directed Readings/Research. (1-3) Prerequisite: prior written consent of instructor. *(Fall, Spring,)*

RELS 6999. Thesis. (3 or 6) May be repeated by permission, if taken for three hours credit. Six hours of Thesis may be taken during a single semester. Appropriate research and written exposition of that research is required. *(On demand)*

RELS 7999. Master's Degree Residence. (1) *(Fall, Spring, Summer)*

SOCIOLOGY

Department of Sociology
476 Fretwell Building
704-687-2252
http://www.socanth.uncc.edu/sociology/maprogram.htm

Degree
M.A., Master of Arts

Director
Dr. Lisa S. Rashotte

Graduate Faculty
Judy R. Aulette, Associate Professor
Charles J. Brody, Professor and Chair
Yang Cao, Assistant Professor
Scott Fitzgerald, Assistant Professor
Rosemary L. Hopcroft, Associate Professor
Larry M. Lance, Associate Professor
Julie McLaughlin, Assistant Professor
Roslyn Mickelson, Professor
Stephanie Moller, Assistant Professor
Lisa S. Rashotte, Associate Professor
Teresa L. Scheid, Associate Professor
Murray Webster, Jr., Professor
Joseph M. Whitmeyer, Professor
Diane Zablotsky, Associate Professor
Wei Zhao, Assistant Professor

MASTER OF ARTS IN SOCIOLOGY

The Master of Arts in Sociology degree program provides students with skills for analysis of social phenomena, from contemporary social problems to theoretical issues. Training concentrates on research design, data analysis, interpretation and application of sociological theory, and core substantive areas of sociology. As culmination, students complete either a thesis or, with a more applied focus, a research practicum.

Program of Study
The M.A. curriculum is designed to meet the needs of students seeking master's level research skills for occupations requiring such expertise: in government, marketing, program planning and evaluation, business, the media, and the non-profit sector. The curriculum also prepares students who wish to pursue the Ph.D., whether in sociology or a related discipline (such as public policy or criminology). Coursework in the program concentrates on building skills in research design, data analysis and interpretation and application of sociological theory. Students complete either a thesis, with oral defense, or a research practicum. Either option entails the student applying sociological knowledge to a problem/topic of his/her interest.

Additional Admission Requirements
1) An overall undergraduate GPA of 3.0 or better
2) An acceptable score on the Graduate Record Examination (GRE)
3) Demonstrated undergraduate competence in research methods, theory and statistics for social research.
4) Eighteen credit hours of social science undergraduate courses.

Prerequisite Requirements
Research Methods, Theory, Statistics for Social Research

Degree Requirements
The program requires 35 semester hours of coursework. To provide all students with a solid grounding in theory and methods of sociological inquiry, 12 hours of core courses are required (Pro-Seminar, Social Theory, Statistics, and Research Methods). In addition to the core, students must take one additional course in research methods and at least two elective courses in the department. Students must complete either a thesis (6 hours) or a research practicum (6 hours). The remaining 8 hours are electives.

Students must earn at least a B in each core course. Students earning a C in one of these courses must repeat the course and earn at least a B the next time it is offered. Students earning a C in two of these courses will be suspended from the program.

Admission to Candidacy Requirements
Completion of at least 24 hours of required work.

Assistantships
The Department of Sociology offers both teaching assistantships and research assistantships; the latter are dependent upon faculty research funding. Teaching assistants assist faculty with coursework, or teach the

undergraduate lab sections in research methods and statistics. They are paid approximately $9,000.00 for nine months of twenty hours per week work during the academic year. The workload and pay for research assistants varies. Assistantships are awarded on the basis of merit and experience.

Internships
While there is no formal system of ongoing internships, agencies do contact the department to find students who would be interested in an internship. Consequently, internships are optional and dependent upon a match between an agency's needs and a student's skills and interests.

Core Courses (must take all four)
SOCY5151 Pro-Seminar: Social Problems and Social Policy (3) (Fall)
SOCY6651 Social Theory (3) (Fall)
SOCY6652 Issues in Social Research (3) (Spring)
SOCY6653 Advanced Quantitative Analysis (3) (Fall)

Additional Courses in Research Methods (must take at least one)
SOCY6136 Qualitative Research Methods (3) (On demand)
SOCY6617 Data Utilization (3) (On demand)
SOCY6630 Investigating Health and Health Services (3) (On demand)
SOCY6640 Evaluation Research for Applied Sociology (3) (On demand)

Outside Electives
Students may take electives (up to 6 hours) from other departments as long as courses are at the graduate level (5000 or above).

Advising
The Graduate Director advises all graduate students until they select a person to serve as their Committee Chair.

Transfer Credit
With departmental approval, students may transfer in up to six hours of graduate work for which the applicant received a grade of B or better from another institution, related UNC Charlotte degree program or related post-baccalaureate work.

Committee
The student's committee shall consist of three faculty members: the Chair and two other individuals who assist with completion of the thesis or research practicum. One member of the committee, not the chair, may be from outside the department.

Thesis
Students formulate a research question or argument and collect empirical evidence to answer that question or support their argument.

Research Practicum
As an alternative to the traditional thesis, students have the option of a research practicum. This may be combined with an internship. The student works with an organization or agency to complete a research evaluation project for the agency.

Research Opportunities/Experiences
Faculty members are actively engaged in research and students are strongly recommended to work with faculty to develop research expertise. In addition, a number of faculty members have funded research projects or internships on which qualified graduate students are able to work.

Tuition Waivers
Both out-of-state and in-state tuition assistance is available and is awarded on the basis of merit and experience.

Financial Assistance
Other than the assistantships and waivers described above, the Department offers the Pearson Fellowship, which is awarded annually to a graduate or undergraduate student who has interests and goals in improving race relations, expanding social justice, and establishing a more peaceful world. The award is made every spring and consists of $500 to be applied to tuition at UNC Charlotte.

Courses in Sociology

SOCY 5090. Topics in Sociology. (3) Prerequisite: Consent of the instructor. Intensive treatment or survey of related topics, depending on student needs and interests. May be repeated for credit as topics vary. *(On demand)*

SOCY 5111. Social Inequality. (3) Distribution of power, privilege and prestige; correlates and consequences of inequality; national and international comparisons. *(Yearly)*

SOCY 5125. Urban Sociology. (3) Cross cultural analysis of urban development, social structure, ecology, demographic composition, and social problems. *(Yearly)*

SOCY 5130. Sociology of Health and Illness. (3) The cultural and structural influences on the definition of health and illness; models of illness behaviors; health demography and epidemiology; social influences on the delivery of health care; ethical issues surrounding health

and illness; the development of relevant social policy. *(Yearly)*

SOCY 5131. Family Policy. (3) Critical analysis of four aspects of family policy; the historical and cultural factors that have resulted in specific policies affecting the family; the specification of contemporary family policy at both the national and state level; the intended and actual application of existing family policy; and the implications and impact of policies as they are interpreted and implemented. *(On Demand)*

SOCY 5134. Families and Aging. (3) Theories explaining the formation and functioning of American families with emphasis on the impact of the aging of society; examination of the current demographic trends and expectations of multigenerational families as well as the future demands and modifications. *(On Demand)*

SOCY 5135. Sociology of Education. (3) Educational institution; the school class as a social system; the school as a social environment and a complex organization. *(Yearly)*

SOCY 5150. Older Individual and Society. (3) Review of the theories explaining the formation and functioning of American families with emphasis on the impact of the aging of society. Examination of the current demographic trends and expectations of multigenerational families as well as the future demands and modifications. *(Yearly)*

SOCY 5151. Pro-seminar: Social Problems and Social Policy. (3) Prerequisite: graduate student in sociology or senior sociology major. Introduction to the discipline of sociology and the UNC Charlotte department; basic skills for graduate school. *(Fall)*

SOCY 5154. Contemporary Social Theory. (3) Elements and process of theory construction; contemporary social theories such as theories of social order and causation, power, class structure and inequality; group process theories; post-modern theories. *(On demand)*

SOCY 5631. Seminar in Family Violence. (3) Prerequisite: senior, graduate student or consent of the instructor. Family violence in the context of a changing society and family system. Principal foci: child abuse, sexual abuse, spouse abuse; other forms of family violence. Investigation of these topics in terms of sociocultural influences and internal dynamics of families. *(On demand)*

SOCY 5632. Changing American Family. (3) Family theories; family system in relation to other social systems; integration of marital, parental and occupational roles in context of changing socioeconomic influences; traditional versus contemporary family roles; breakdown in stable family functioning. *(On demand)*

SOCY 6090. Topics in Sociology. (3) Prerequisite: consent of department. Intensive treatment of a topic or survey of related topics, depending on student needs and interests. may be repeated for credit as topics vary. *(On demand)*

SOCY 6130. Sociology of Aging: Theories and Research. (3) Application of stratification theories and demography are applied to the older population. Issues of race, gender, socio-economic status, age, and geographic distribution are examined to investigate the diversity of the older age group and their access to resources. *(Alternate years)*

SOCY 6135. Social Context of Schooling. (3) The political economy of schooling; race, class, and gender effects on educational processes and outcomes; the school as a complex organization; the sociology of school reform movements. *(Alternate years)*

SOCY 6136. Qualitative Research Methods. (3) Collection and analysis of qualitative data including use of grounded theory and a variety of qualitative techniques, consideration of ethical issues and the use of data. *(On demand)*

SOCY 6137. The Political Economy and School Reform. (3) Prerequisite: SOCY 4135, graduate status, or consent of instructor. Relationship between the business community's vision for school reform and the school restructuring movement locally and nationally, including social and political processes associated with corporate involvement in defining the problem with schools and shaping solutions, the intersection of education and the economy, and the relationship between schooling and social inequality. *(On demand)*

SOCY 6138. Social Organization of Health Care. (3) Focuses on the structures and operations of health care institutions and providers. The topics covered include the socio-historical development of the existing health care system, health care occupations and professions, professional power and autonomy, professional socialization, inter-professional and provider-patient relations, health care organizations and the delivery of services, and how social change affects the health care sector. *(On demand)*

SOCY 6614. Self and Society. (3) Examination of theoretical constructs and substantive concerns relevant to the socialization process; comparison of symbolic interactionism, ethnomethodology, phenomenology; emphasis on social construction of reality in various "social worlds" (deviant, work, family). *(Alternate years)*

SOCY 6615. Dilemmas in Organizations. (3) Examines organizational theory and research focused on organizational behavior, inter-organizational relations, relations with external stakeholders and organizational culture. Case study analysis, group-problem solving and

the study of concrete organizational dilemmas. *(On demand)*

SOCY 6616. Stratification and Inequality. (3) Examination of theories of stratification and the causes, processes and social consequences of economic and political inequality; assumptions behind, mechanisms for, and consequences of government and private sector strategies to address problems associated with inequality. *(Alternate years)*

SOCY 6617. Data Utilization. (3) Methodological and statistical strategies for applied sociological research within organizational settings; selecting the best strategies consistent with budgetary, manpower and organizational constraints; interpreting and communicating research results in ways understandable to and useful for organizational decision-makers. *(Alternate years)*

SOCY 6630. Investigating Health and Health Services. (3) Prerequisites: SOCY 4130, or graduate standing, or permission of instructor. Useful to those seeking research careers, to administrators in health care, and to primary care providers. How to conduct and evaluate research in health care settings, emphasizing both quantitative and qualitative methodologies as well as the utilization of secondary data. *(Alternate years)*

SOCY 6640. Evaluation Research for Applied Sociology. (3) Prerequisites: SOCY 6652 and introductory statistics. Evaluation research from an applied sociological perspective, including incorporation of social theory, substantive social science knowledge, and research techniques into the evaluation of a variety of programs, interventions, and policies. *(On demand)*

SOCY 6651. Social Theory. (3) Analysis of contemporary social theories, with emphasis on their implications for planned change. *(Fall)*

SOCY 6652. Issues in Social Research. (3) Examination of epistemology of social research; assumptions and methods of specific research strategies; ethical and policy issues of applied and academic research. *(Spring)*

SOCY 6653. Advanced Quantitative Analysis. (3) Prerequisites: six hours in Introductory Statistics and/or Research Methods. Contemporary techniques of data analysis, management and processing applied to specific topics; measurement models, data reduction strategies, and multivariate procedures. *(Fall)*

SOCY 6895. Tutorial in Sociology. (1-4) Prerequisite: permission of instructor. Directed reading and/or research; development of expertise in substantive area. May be repeated for credit. *(Fall, Spring, Summer)*

SOCY 6897. Research Practicum. (1-6) Prerequisite: SOCY 6651 and 6652. Preparation of research paper based upon research completed within a community organization or agency. The student will develop a consultant-client relationship with the agency or organization and conduct a research/evaluation project on behalf of the agency or organization (such as a needs assessment, program evaluation, social impact assessment or policy analysis. *(Fall, Spring)*

SOCY 6996. Thesis. (1-6) Prerequisites: completion of all other coursework and admission to candidacy by Graduate Committee. Applied, academic, or theoretical research project, defended before graduate faculty. May be repeated for credit up to six hours. *(Fall, Spring, Summer)*

SOCY 7999. Graduate Residence. (1) Continuation of individual thesis project. *(Fall, Spring, Summer)*

SPANISH

Department of Languages and Culture Studies

427 College of Education Building
704-687-8753 or 704-687-8754; Fax 704-687-3496
http://www.languages.uncc.edu/index.htm

Degree

M.A; Graduate Certificate in Translating and Translation Studies

Coordinator

Dr. Ann B. González

Graduate Faculty

Spanish
José Manuel Batista, Assistant Professor
Carlos Coria-Sánchez, Assistant Professor
Colleen Culleton, Assistant Professor
Michael Scott Doyle, Professor
Robert M. Gleaves, Associate Professor (Emeritus)
Concepción Godev, Associate Professor
Ann B. González, Associate Professor
Jasleen Kohli, Assistant Professor
Maryrica Ortiz Lottman, Assistant Professor
Martha LaFollette Miller, Professor
Anton Pujol, Assistant Professor

Classical Languages
Dale Grote, Associate Professor

French
Michèle Bissière, Associate Professor
Marie-Thérèse Noiset, Associate Professor
Russell Rose, Associate Professor
Robert Sandarg, Associate Professor
Katherine Stephenson, Associate Professor

Christine Vance, Associate Professor

German
Anabel Aliaga-Buchenau, Assistant Professor
Paul Youngman, Assistant Professor
Robert Reimer, Professor

MASTER OF ARTS IN SPANISH

The Master of Arts in Spanish is designed to provide a rich variety of graduate coursework in a major world language that is becoming increasingly important in the United States. The program builds on a comprehensive undergraduate curriculum and consists of two tracks: Language, Literature and Culture (LLC) and Translating and Translation Studies (TTS). The M.A. in Spanish serves individuals who seek a greater understanding of Spanish language, literatures and cultures, and who seek career and professional advancement opportunities in education, translation, applied language (Business Spanish), or who contemplate pursuing a Ph.D. in Spanish linguistics or literature.

Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for the M.A. in Spanish:

1) A baccalaureate degree in Spanish or in a related field that required upper-division coursework in undergraduate Spanish (e.g., Latin American Studies, International Studies, International Business), with an overall GPA of at least 2.75 (on a 4.0 scale).
2) An acceptable score on the Aptitude Portion of the Graduate Record Examination (GRE).
3) An essay that addresses the applicant's motivation for enrolling in the M.A. in Spanish, to include particular areas of research interests and career or professional goals. Students seeking enrollment in the LLC track should write this essay in Spanish and demonstrate a high level of proficiency in Spanish by attaching an additional writing sample (a college term paper or similar document). Students seeking enrollment in the TTS track may write the essay in either English or Spanish but must demonstrate high levels of literacy and proficiency in both languages by providing writing samples in each.
4) An oral interview with the Graduate Coordinator.
5) Three letters of reference. For those interested in the LLC track, at least two of the letters must be from professors. For those interested in the TTS track, at least one of the letters must come from a professor, and letters not written by a faculty member must be from professionals working in the field of Spanish, translating and interpreting, or a closely related area (Latin American Studies, International Studies, International Business, etc.).

Prerequisite Requirements

Applicants who do not have advanced-level undergraduate coursework in Spanish language and the literature and culture of Spain and Latin America will be required to take a minimum of two courses in these areas as part of their preparation for enrollment in the M.A. program. Such coursework may be taken as a post-baccalaureate graduate student (PBG), and up to six hours of such coursework may be transferred forward to the M.A. program upon admission to the program.

Degree Requirements

The Master of Arts in Spanish requires 36 graduate credit hours: either 36 hours of graduate coursework or 30 hours of graduate coursework plus a master's thesis (6 credit hours). For any course to count toward the M.A. in Spanish, it must have been taken within six years from the date of enrollment in the program. All coursework must have a grade of A or B in order to be counted toward the M.A. in Spanish.

Admission to Candidacy Requirements

Upon successful completion of a minimum of 18 semester hours of graduate coursework, and in no case later than four weeks prior to the beginning of the semester in which he/she expects to complete all requirements for the degree, a student should file for admission to candidacy on a form that is available in the Graduate School. This application is a check sheet approved by the student's advisor, and program administrator listing all coursework to be offered for the degree (including transferred credit and courses in progress).

Assistantships

A limited number of graduate assistantships are available each year. Applications must be submitted by May 1 for assistantships beginning the following academic year. Further information is available in the Department.

Internships

The Department offers a limited number of internships (SPAN 5410 and TRAN 6480S) which provide program-related experience for graduate students who seek to develop their Spanish skills in a professional setting. Further information is available in the Department.

Practica

The Department offers TRAN 6481S, Translation Cooperative Education (1-3 hours of credit) to provide on-site work in translating texts or interpreting, English↔Spanish. Site, workload and remuneration to be determined in consultation with employer and one faculty co-op advisor. Provides practical and professional training experience under conditions that the University cannot duplicate.

Core Courses
All M.A. candidates, regardless of which track option is pursued—Language, Literature and Culture (LLC) or Translating and Translation Studies (TTS)—must complete four graduate core courses (12 hours) distributed as follows: one in Spanish literature, one in Spanish American literature, one in Spanish or Spanish American civilization and culture, and one in Spanish linguistics.

Track descriptions

Track I: Language, Literature and Culture (LLC). The LLC track formally consists of 24 hours of graduate credits in addition to the 12 core hours—either 24 hours of graduate coursework or 18 hours of graduate coursework plus a master's thesis (6 credit hours)—in Spanish and Spanish American literature, Spanish and Spanish American civilization and culture (including film studies), Spanish linguistics, methodology, applied language (Spanish for business and international trade), special topics in Spanish, and may include up to 3 hours of professional internship in Spanish. The LLC track allows for an in-depth development of Spanish language skills and is especially recommended for teachers of Spanish. It also provides excellent preparation for individuals who may wish to pursue the Ph.D. in Spanish, for whom courses in literature are especially recommended.

Track II: Translating and Translation Studies (TTS). The TTS track formally consists of 24 hours of graduate credits in addition to the 12 core hours—either 24 hours of graduate coursework or 18 hours of graduate coursework plus a master's thesis (6 credit hours)—in the history and theory of translation, and the analysis and translation of different types of texts and discourse: business, technical, medical, legal, scholarly, and literary. It may also include special topics courses in Spanish↔English translation, up to 3 hours of professional internship in translating, and a translation thesis (equivalent to 6 hours). Coursework in applied language areas such as Business Spanish is especially appropriate for the TTS track. This specialized track serves individuals interested in a career in professional translation or in enhancing their career or work opportunities as language and culture specialists.

Electives
With the approval of the department, a student may take 3 hours of elective credit in related areas as part of the 30-36 hours. The student must submit a written request to the Graduate Coordinator explaining how these hours of elective credit will enrich his/her program.

Advising
Graduate students will be advised by the Graduate Coordinator and by designated graduate faculty members in good standing.

Transfer Credit
Up to six hours of appropriate graduate credit may be accepted for transfer from another accredited institution. Additional non-residence credit for graduate study abroad may be possible via departmental pre-approval.

Licensure
Students seeking licensure in Spanish should obtain information on requirements from the Teacher Education Advising and Licensure Office (TEAL) in the College of Education.

Comprehensive Examination
Students must satisfactorily complete a combined written and oral examination based partly on a core Reading List and partly on the coursework completed. The Reading List is available in the Department office and is published in the Department Web Page (Spanish). The oral and written examination may not be attempted before the last semester of coursework, exclusive of thesis credits. Students must be enrolled during the semester in which they take the comprehensive examination.

Thesis
The M.A. thesis is optional for both tracks: Language, Literature and Culture (LLC) and Translating and Translation Studies (TTS).

Application for Degree
Follows University policy.

Tuition Waivers
One or more in-state as well as out-of-state tuition waivers may be available for new graduate assistants and/or outstanding applicants.

GRADUATE CERTIFICATE IN TRANSLATING AND TRANSLATION STUDIES
(GCTTS: English to Spanish and Spanish to English)

The Department of Languages and Culture Studies at UNC Charlotte offers a Graduate Certificate in Translating and Translation Studies (TTS) designed for post-baccalaureate, graduate, and post-graduate students. Students can complete the required 18 graduate credit hours in three semesters, and may begin the program in either the fall or spring semester, or during the summer. Students enrolled in the Language, Literature and Culture track (LLC) of the M.A. in Spanish program can receive the Graduate Certificate in TTS by completing the 12 hours of Certificate Requirements indicated below. Students interested in adding on the Graduate Certificate in TTS to the M.A. in LLC must apply separately for the Certificate. One application does not cover both programs. Students in the Certificate Program will study

the history, theory, and profession of translation; work intensively in the analysis and translation of different types of discourse, including non-literary and literary texts; become familiar with computer-assisted translation; and develop advanced post-editing skills. Graduate level coursework may also include special topics courses in translation and up to 3 hours of professional internship credit in translating. Translating is done from both Spanish to English and English to Spanish.

Admission Requirements

Students must apply for admission to the Graduate School and must have a minimum undergraduate GPA of 2.75. Applicants will generally have a baccalaureate degree in Spanish or in a closely related area that requires sufficient upper-division coursework in Spanish (e.g., Latin American Studies, International Studies, International Business), or an undergraduate degree, certificate or minor in translation (English to Spanish, Spanish to English). They will be required to submit:

1) A current GRE or MAT score (international students have an additional requirement of submitting official scores on the Test of English as a Foreign Language [TOFEL]).
2) A well-developed essay in English that addresses the applicant's motivation for enrolling in the Graduate Certificate.
3) Three letters of reference (from professors, specialists in translation, and/or employers).
4) An oral interview with the Graduate Coordinator.
5) A portfolio of best writing samples in both English and Spanish or of translations into each language (with original text to accompany each translation submitted).

Certificate Requirements (12 hours)

TRAN6001S History and Theory of Translation
TRAN6472S Advanced Non-Literary Translating I (Business, Legal, Governmental)
TRAN6474S Advanced Non-Literary Translating II (Medical and Technical)
TRAN6476S Advanced Literary and Cultural Translating

Electives (6 hours)

SPAN6001 Advanced Studies in Spanish Language (especially recommended)
TRAN6003S Translating and the Computer
TRAN6480S Translation Internship
TRAN6900S Special Topics in English↔Spanish Translation Studies
TRAN6901S Advanced Project in English↔Spanish Translating

Other Courses

As appropriate and approved by the Department. Graduate courses in Hispanic literature, civilization and culture, and linguistics are especially recommended because of the insight they provide into the Spanish language and Hispanic cultures (see courses offered in the LLC track of the Spanish M.A.).

Generally, only graduate courses taken at UNC Charlotte will count toward the Graduate Certificate. However, up to a maximum of 6 hours of coursework may be transferred into the Certificate program if the courses are approved by the Department of Languages and Culture Studies. Twelve of the 18 credit hours for the Graduate Certificate must be taken in residency.

Courses In Spanish

SPAN 5050. Selected Topics in Spanish. (1 2 3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Consideration of a predetermined topic. May be repeated for credit as topics vary. *(On demand)*

SPAN 5120. Advanced Business Spanish I. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Advanced studies in Business Spanish, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as economics, management, and marketing. *(Fall)*

SPAN 5121. Advanced Business Spanish II. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Advanced studies in Business Spanish, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as marketing, finance, and import-export. *(Spring)*

SPAN 5201. Nineteenth Century Spanish Literature. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Survey of Peninsular literature from Costumbrismo through the Generation of 1898. Lectures, discussions, and reports. *(On demand)*

SPAN 5202. Twentieth Century Spanish Literature. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Treatment of major literary developments from the Generation of 1898 to present day. Lectures, discussions, and reports. *(On demand)*

SPAN 5205. Novel of the Golden Age. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. El Lazarillo through El Criticón. Lectures, discussions, and reports. *(On demand)*

SPAN 5206. Theater of the Golden Age. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Study of works of the leading dramatists of the period. Lectures, discussions, and reports. *(On demand)*

SPAN 5210. Studies in Spanish American Poetry. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Studies of 19th and 20th century Spanish American poetry. *(On demand)*

SPAN 5211. Studies in Spanish American Prose Fiction. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Studies of 19th and 20th century Spanish American prose fiction. *(On demand)*

SPAN 5212. Studies in Spanish American Theater. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Studies of 20th century Spanish American theater. *(On demand)*

SPAN 5213. Don Quijote. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Study of Cervantes' masterpiece. *(On demand)*

SPAN 5410. Professional Internship in Spanish. (1-6) Prerequisites: Post-baccalaureate status, B.A. in Spanish, and consent of the Department. Faculty-supervised field and/or research experience in a cooperating profession (e.g. business) or community organization. Contents of internship based upon a contractual agreement among the student, department, and business or community organization. Offered on a Pass/No Credit basis. *(Fall, Spring, Summer)*

SPAN 5800. Directed Individual Study. (1-3) Prerequisite: Post-baccalaureate status, B.A. in Spanish or permission of the Department. Individual work on a selected area of study. To be arranged with the instructor, generally during the preceding semester. By special permission only. May be repeated for credit. *(On demand)*

SPAN 6001. Advanced Studies in Spanish Language. (3) Selected topics in Spanish linguistics. Topics may include a) history of the Spanish language; b) introduction to Spanish phonology and morphology; and c) Spanish dialectology. May be repeated for credit as topics vary. *(On demand)*

SPAN 6003. Studies in Hispanic Culture and Civilization. (3) Selected topics on the civilization and culture of the Spanish-speaking world. Possible emphases include 1) the press in Spanish America; 2) song texts of the Hispanic world; 3) Spanish cinema; 4) Spain since Franco; 5) Hispanics in the United States. May be repeated for credit as topics vary. *(On demand)*

SPAN 6005. Advanced Studies in Spanish Literature. (3) Study of selected works and writers from Spain. May be repeated for credit as topics vary. *(On demand)*

SPAN 6007. Advanced Studies in Spanish American Literature. (3) Study of selected works, writers, literary genres, periods, and schools from Spanish America. May be repeated for credit as topics vary. *(On demand)*

SPAN 6201. Hispanic Language and Culture through Media. (3) In-depth study of contemporary Hispanic culture and language through media sources, including print, radio, film, Internet, and television. The course provides cultural exposure, and practice in written and oral communication, and training in the use of technology--assisted instruction. *(On demand)*

SPAN 6901. Advanced Project. (3) Appropriate research and written exposition of that research. The proposed project, as well as the final product, will be approved by a committee of three faculty members appropriate to the topic, appointed by the Chair of the department after consultation with the student and the Graduate Coordinator, on the basis of a written proposal from the student. *(On demand)*

SPAN 6902. Thesis. (6) Appropriate research and written exposition of that research. The proposed project, as well as the final product, will be approved by a committee of three faculty members appropriate to the topic, appointed by the Chair of the Department after consultation with the student, on the basis of a written proposal from the student. (A statement of recommendations and requirements for form and procedure is available in the office of the Department of Languages and Culture Studies.) *(On demand)*

Courses In Translating And Translation Studies

TRAN 6001S. History and Theory of Translation. (3) Theories of translation from Horace and Cicero to the present. Provides a historical, theoretical, and sociological framework for the translation enterprise. Emphases may differ from year to year. *(On demand)*

TRAN 6003S. Computer-Assisted Translating. (3) Focus on discourse and textual typologies (representative kinds of writing and kinds of documents and texts) that the practicing translator may encounter. Development of reading, recognition, and reproduction skills. Strategies for lexical development and terminology management. *(On demand)*

TRAN 6472S. Workshop on Non-Literary Topics I (Business, Legal, Governmental). (3) Theory-based workshop practicum dealing with the English↔Spanish translation of authentic business, legal, and/or governmental documents. Emphasis may center on any one of these types of discourse or any combination thereof. *(On demand)*

TRAN 6474S. Workshop on Non-Literary Topics II (Medical and Technical). (3) Theory-based workshop practicum dealing with the English↔Spanish translation

of authentic medical, technical, and/or scientific documents. Emphasis may center on any one of these types of discourse or any combination thereof. *(On demand)*

TRAN 6476S. Workshop on Literary and Cultural Topics. (3) Theory-based workshop practicum dealing with the English↔Spanish translation of literary and/or cultural texts. Emphasis may center on one or both of these types of discourse. *(On demand)*

TRAN 6480S. Translation Internship. (1-3) On-site work in translating texts or interpreting, English↔Spanish. Site and workload to be determined in consultation with employer and one faculty internship advisor. Provides practical and professional training experience under conditions that the University cannot duplicate. *(On demand)*

TRAN 6481S. Translation Cooperative Education. (1-3) On-site work in translating texts or interpreting, English↔Spanish. Site, workload and remuneration to be determined in consultation with employer and one faculty co-op advisor. Provides practical and professional training experience under conditions that the University cannot duplicate. *(On demand)*

TRAN 6900S. Special Topics in English↔Spanish Translation Studies. (3) Selected topics in English↔Spanish Translating and Translation Studies, e.g., continued study of theories of translation, translation of a literary genre such as prose fiction, drama or poetry, translation of historical, political or social documents, or interpretation. May be repeated for credit as topics vary. *(On demand)*

TRAN 6901S. Advanced Project in English↔Spanish Translating. (3) Selected topics in English↔Spanish Translating and Translation Studies, e.g., continued study of theories of translation, translation of a literary genre such as prose fiction, drama or poetry, translation of historical, political or social documents, or interpretation. May be repeated for credit as topics vary. *(On demand)*

TRAN 6902S. Thesis. (6) Appropriate research and written exposition of that research, or substantial English↔Spanish translation project with critical introduction and commentary. The proposed thesis work, as well as the final product, will be approved by a committee of three faculty appropriate to the topic, appointed by the Chair of the Department after consultation with the student and the Graduate Coordinator, on the basis of a written proposal from the student. (A statement of recommendations and requirements for form and procedure is available in the office of the Department of Languages and Culture Studies.) *(On demand)*

GENERAL GRADUATE COURSES IN ARTS AND SCIENCES

Anthropology

ANTH 5090. Topics in Anthropology. (3) Prerequisite: consent of the instructor. Intensive treatment of a topic in anthropology or survey of related topics. Examples: Religion, Art, and Archaeology; Islam and Globalism. May be repeated for credit as topics vary. *(On demand)*

ANTH 5120. Intercultural Communications. (3) Prerequisite: ANTH 1101 or consent of instructor. Learning to cope with cultural differences; contrasting value systems; cross-cultural and communication styles; nonverbal communication; cultural relativity; culture and business; ethnocentricism; cultural shock. *(Yearly)*

ANTH 6132. Culture, Health and Aging. (3) Exploration of the interaction between culture and the aging experience, with a particular emphasis on issues of health and the health care system. *(On demand)*

Foreign Language, French, And German

Foreign Language

FORL 5050. Topics in Foreign Language. (3) Prerequisite: Post-baccalaureate status, B.A. in French, German or Spanish, or permission of the Department. Studies in a selected field of interest. May be repeated for credit with change of topic. *(On demand)*

FORL 5200. Secondary Methods--Foreign Languages. (3) Prerequisite: Post-baccalaureate status, B.A. in French, German or Spanish, or permission of the Department. Current trends and practices in teaching foreign and second languages in the middle school and high school, with emphasis on practical applications. Addresses state mandated competencies. Required for licensure in the teaching of foreign language and recommended for licensure in teaching English as a Second Language. *(On demand)*

FORL 5201. Foreign Languages in the Elementary School Methods. (3) Prerequisite: Post-baccalaureate status, B.A. in French, German or Spanish, or permission of the Department. Current trends and practices in teaching foreign and second languages in the elementary school, with emphasis on practical applications. Addresses state mandated competencies. Required for licensure in the teaching of a foreign language and recommended for licensure in teaching English as a Second Language. *(On demand)*

FORL 5800. Directed Individual Study. (1-3)
Prerequisite: Post-baccalaureate status, B.A. in French, German or Spanish, or permission of the Department. Individual work on a selected area of study. To be arranged with the instructor, generally during the preceding semester, and by special permission only. May be repeated for credit. *(On demand)*

French

FREN 5003. Studies in French Literature. (3)
Prerequisite: Post-baccalaureate status, B.A. in French, or permission of the Department. Course may be repeated with change of topic. *(On demand)*

FREN 5005. Studies in the French Language. (3)
Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Course may be repeated with change of topic. *(On demand)*

FREN 5007. Studies in French Culture and Civilization. (3) Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Course may be repeated with change of topic. *(On demand)*

FREN 5050. Topics in French. (1-3) Prerequisites: Post-baccalaureate status, B.A. in French, English 1102 or equivalent if taught in English. May be taught in French or English. Will not count toward the major if taught in English. Course may be repeated with change of topic. *(On demand)*

FREN 5120. Advanced Business French I. (3)
Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Advanced studies in Business French, with intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as economics, management, and marketing. *(On demand)*

FREN 5121. Advanced Business French II. (3)
Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Advanced studies in Business French, with intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as marketing, finance, and import-export. *(On demand)*

FREN 5201. Survey of French Literature I. (3)
Prerequisite: Post-baccalaureate status, B.A. in French, or permission of the Department. The major literary movements from the Middle Ages to the Enlightenment, with sample texts. Emphasis on continuity and change. *(On demand)*

FREN 5202. Survey of French Literature II. (3)
Prerequisite: Post-baccalaureate status, B.A. in French, or permission of the Department. The major literary movements from the Enlightenment to the contemporary period, with sample texts. Emphasis on continuity and change. *(On demand)*

FREN 5410. Professional Internship in French. (1-6)
Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Faculty-supervised field and/or research experience in a cooperating profession (e.g., business) or community organization. Contents of internship based upon a contractual agreement among the student, department, and business or community organization. Offered on a Pass/No Credit basis. *(Fall, Spring, Summer)*

FREN 5800. Directed Individual Study. (1 3)
Prerequisite: Post-baccalaureate status, B.A. in French, or permission of the Department. Individual work on a selected area of study. To be arranged with the instructor, generally during the preceding semester, and by special permission only. May be repeated for credit. *(On demand)*

German

GERM 5010. Periods in the History of German Literature. (3) (a) Medieval literature, (b) Classicism, (c) Romanticism, (d) Nineteenth Century, (e) Contemporary literature. Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. Study of the major writers and works in a given period. Readings, lectures, and reports. May be repeated for major credit with change of topic. *(On demand)*

GERM 5020. The Chief Genres in German Literature. (3) (a) Novel, (b) Theater, (c) Lyric poetry, (d) short prose fiction. Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. An analysis of a major genre and its development within German literary history. Readings, lectures and reports. May be repeated for major credit with change of topic. *(On demand)*

GERM 5050. Special Topics in German. (1-3)
Prerequisite: Post-baccalaureate status, B.A. in German, or permission of the Department. Treatment of a special group or figure in German literature, specialized topic in German culture or language, or special problems in German conversation. May be repeated for credit with change of topic. *(On demand)*

GERM 5120. Advanced Business German I. (3)
Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. Advanced studies in Business German, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as economics, management, and marketing. *(On demand)*

GERM 5121. Advanced Business German II. (3)
Prerequisite: Post-baccalaureate status, B.A. in German, or permission of the Department. Advanced studies in Business German, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as marketing, finance, and import-export. *(On demand)*

GERM 5203. Survey of German Literature I. (3) Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. General introduction to German literature from the Middle Ages to the Classical Period. Book reports and class discussion on collateral readings. *(On demand)*

GERM 5204. Survey of German Literature II. (3) Prerequisite: Post-baccalaureate status, B.A. in German, or permission of the Department. German literature since Classicism. Book reports and discussions on collateral readings. *(On demand)*

GERM 5410. Professional Internship in German. (1-6) Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. Faculty-supervised field and/or research experience in a cooperating profession (e.g., business) or community organization. Contents of internship based upon a contractual agreement among the student, department, and business or community organization. *(Fall, Spring, Summer)*

GERM 5800. Directed Individual Study. (1-3) Prerequisite: Post-baccalaureate status, B.A. in German, or permission of the Department. Individual work on a selected area study. To be arranged with the instructor, generally during the preceding semester, and by special permission only. May be repeated for credit. *(On demand)*

Political Science

POLS 6000. Topics for Graduate Study in Political Science. (1-4) Intensive study of a topic in Political Science. The topic of investigation may vary from semester to semester. May be repeated for credit. *(On demand)*

POLS 6800. Independent Study. (1-3) Prerequisite: consent of the instructor. Supervised investigation of a political problem that is (1) of special interest to the student; (2) within the area of the instructor's special competence; and (3) normally an extension of previous coursework with the instructor. A student may take more than one course under this number but not more than three hours a semester. *(Fall, Spring, Summer)*

Women's Studies

WMST 5050. Topics in Women's Studies. (1-3) Prerequisites and credit hours vary with topics. Special topics in Women's Studies. May be repeated for credit as topics vary. *(On demand)*

WMST 6050. Topics in Women's Studies. (1-3) Prerequisites and credit hours vary with topics. Special topics in Women's Studies. May be repeated for credit as topics vary. *(On demand)*

WMST 6800. Directed Reading/Research. (3) Prerequisites: prior written permission of instructor and Women's Studies Director. Independent investigation of a problem or a topic in Women's Studies, culminating in a research paper or a final report. Student must provide a written plan of work before registering for the course. May be repeated for credit. *(On demand)*

BELK COLLEGE OF BUSINESS ADMINISTRATION

The Belk College of Business Administration is accredited by AACSB International, the premier accrediting agency for academic programs in business administration and accounting. Our challenging masters programs in Accountancy, Business Administration, Economics and Mathematical Finance provide graduates with the tools they need to succeed in business. Courses are taught by full-time faculty with Ph.D.s from top schools whose research is published in top-level journals and whose expertise is highly sought after by industry executives. Students have the opportunity to network with professionals from a variety of fields, and interact with alumni and leaders from Charlotte's dynamic business community. These programs provide flexible schedules with courses offered both at UNC Charlotte's main campus and at our uptown campus in the heart of Charlotte's center city, so that working professionals may earn their graduate degree without interrupting their careers.

Graduate Degree Programs

Master of Accountancy
Master of Business Administration
Master of Science in Economics
Master of Science in Mathematical Finance *(The Department of Finance and the Department of Economics in the Belk College of Business Administration are participating departments in the Inter-College Master of Science in Mathematical Finance program. See the Inter-College Graduate Programs section of this Catalog for complete information and program requirements.)*

Graduate Non-Degree Programs

MBA PLUS Post-Masters Certificate

ACCOUNTING

Department of Accounting

259 Friday Building
704-687-2445
http://www.uncc.edu/macc

Degree

Master of Accountancy (MACC)

Coordinator

Dr. Jack Cathey

Graduate Faculty

Sak Bhamornsiri, Associate Professor
Alan Blankley, Associate Professor
Cindy Blanthorne, Assistant Professor
Hughlene Burton, Assistant Professor
Jack Cathey, Associate Professor
Nabil Elias, Associate Professor
Howard Godfrey, Professor
John Griffing, Adjunct Faculty
Bob Guinn, Associate Professor
David Kerr, Associate Professor
Michele Matherly, Assistant Professor
Richard Schroeder, Professor
Suzanne Sevin, Assistant Professor
Casper Wiggins, Big Five Distinguished Professor

MASTER OF ACCOUNTANCY

The Master of Accountancy program is a multiple track program designed to prepare accountants for the rapidly changing expectations of the profession. The program has three tracks: Professional Accounting, Financial Accounting/Auditing and Tax. The program also includes the option for development of an individualized program of study. Completion of the Professional Accounting track or the Financial Accounting/Auditing track will enable students to pursue licensure in states requiring 150 semester hours.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, an acceptable score on the verbal and quantitative portions of the Graduate Management Admission Test is required for graduate study in Accounting.

Degree Requirements

The program leading to the Master of Accountancy degree consists of 30 semester hours (10 graduate classes) of course work. The 30 hours are divided into two components: accounting classes and elective classes. See the track descriptions below for more information on required and elective classes.

A maximum of six hours of transfer credit can be accepted from another accredited business school upon approval by the program coordinator and the Dean of the Graduate School. A 3.0 GPA is required in all courses taken for graduate credit and a maximum of three C's is permitted for continuation in the program. The residence requirement is satisfied by completion of at least three-fourths of the required courses while in residence. Neither a comprehensive examination nor a thesis is required.

Admission to Candidacy Requirements

An Admission to Candidacy form listing graduate-level course that apply to the degree must be submitted to the

Graduate Coordinator one month prior to the semester in which the student plans to complete the course work for the degree.

Assistantships

Assistantships are available on a competitive basis.

Accounting Program Tracks

Professional Accounting Track

The Professional Accounting Track is designed for students who have an interest in preparing for careers in public accounting, consulting, and corporate accounting. The track is designed for students who do not have an undergraduate degree in accounting. It is also designed for students who have an undergraduate degree in accounting from outside of the United States. The program is offered in both full-time and part-time formats with classes offered both during the daytime and in the evenings.

Prerequisite classes: Intermediate Financial Accounting I and II (ACCT 3311 and 3312) or equivalent.

The required classes for this track are:

ACCT5220	Income Tax
ACCT5230	Advanced Income Tax
ACCT6210	Advanced Accounting Information Systems
ACCT6260	Advanced Financial Accounting I
ACCT6270	Advanced Financial Accounting II
ACCT6220	Financial Statement Auditing
ACCT6230	Advanced Managerial Accounting

In addition to the required classes a student is expected to complete three elective classes.

Financial Accounting/Auditing Track

The Financial Accounting/Auditing track is designed for students wishing to pursue careers in public accounting, consulting, and corporate accounting. The track is designed for students who have an undergraduate degree or equivalent in accounting from a U.S. university. The program is offered in both full-time and part-time formats with classes offered both during the daytime and in the evenings.

The required classes for this track are:

ACCT6260	Advanced Financial Accounting I
ACCT6270	Advanced Financial Accounting II
ACCT6210	Advanced Accounting Information Systems
ACCT6220	Financial Statement Auditing
ACCT6230	Advanced Managerial Accounting
ACCT5230	Advanced Income Tax

In addition to the required classes a student is expected to complete four elective classes.

Tax Track

The Tax track is designed for students who wish to specialize in taxation. Student can enroll in the Tax track with or without an undergraduate degree in Accounting. The program is offered in both full-time and part-time formats with tax classes offered in only the evenings.

Prerequisite classes: An Introduction to Financial Accounting (ACCT 2121 or equivalent) and Federal Taxation (ACCT 4220/5220 or equivalent).

The required classes for this track are:

ACCT5230	Advanced Income Tax
ACCT6110	Tax Research and Planning
ACCT6120	Taxation of Corporations and Shareholders
ACCT6130	Taxation of Pass-Through Entities

In addition to the required classes a student is expected to complete six elective classes including at least two electives in taxation or accounting. Electives are available for students who wish to specialize in tax and also prepare for the CPA exam.

Individualized Track

The Individualized Track is designed for students with unique career and professional goals that are not met by the other tracks. Consultation with the Graduate Coordinator is required for this track.

Advising

Prior to, or concurrent with, the start of the first semester of study each student will be expected to complete a program of study listing each class the student expects to take as a part of the program.

Application for Degree

An Application for Degree form must be completed and submitted with the graduation fee to the Registrar's Office by the published deadline.

Program Certifications/Accreditation

The Belk College of Business and the Department of Accounting are accredited by The Association to Advance Collegiate Schools of Business (AACSB International).

Courses In Accounting

ACCT 5220. Income Tax. (3) An introduction to the Federal income tax system with emphasis on concepts and procedures applicable to all types of entities. *(Fall)*

ACCT 5230. Advanced Income Tax. (3) An examination of advanced tax topics regarding corporations, partnerships, and individuals. In addition, estate and gift, fiduciary accounting, tax-exempt entities

and retirement plans will be examined at an introductory level. *(Fall, Spring)*

ACCT 6110. Tax Research and Planning. (3) Tax research techniques applicable to federal tax law affecting individuals, corporations and partnerships, including use of traditional and computerized tax services to solve tax problems. Emphasis on tax planning principles and related tax practice matters, including handling tax compliance issues and dealing with the Internal Revenue Service. *(Fall)*

ACCT 6120. Taxation of Corporations and Shareholders. (3) This course examines the federal and state tax law applicable to corporations and their shareholders. The course covers tax compliance matters, strategies for minimizing tax liabilities and strategies for handling tax controversies. *(Spring)*

ACCT 6130. Taxation of Pass-Through Entities. (3) Tax law applicable to partnerships, Limited Liability Companies and S corporations, including tax compliance matters strategies for minimizing tax liabilities and strategies for handling tax controversies. *(Fall)*

ACCT 6140. Taxation of Estates, Gifts, and Trusts. (3) Wealth transfer taxes and taxation of estates and trusts, including integration of these taxes and tax planning opportunities for minimizing tax liabilities. *(Summer)*

ACCT 6150. Tax Strategy and Policy. (3) Tax strategies in all phases of business operations, including creation of the business, choice of the type of business entity, financing, operations, distributions to owners, expansion, reorganization and liquidation with emphasis on minimizing taxes and avoid tax traps. Analysis of business planning cases and completion of a comprehensive project with the results presented in both an oral and written report. *(On demand)*

ACCT 6160. Advanced Individual Taxation. (3) This course focuses on topics related to the taxation of individuals to enable the student to better advise taxpayers on theses matters, identify problem areas and assist in tax planning matters to minimize the amount of tax due. Topics include: passive loss limitation rules, interest categorization and limitations, individual alternative minimum tax, individual net operating loss rules and rules concerning divorced taxpayers. *(On demand)*

ACCT 6199. Topics in Taxation. (1-4) This course covers topics in the area of taxation that go beyond the coverage in other existing courses by either addressing new tax issues or by delving more deeply into a tax topic. *(On demand)*

ACCT 6210. Advanced Accounting Information Systems. (3) Documentation and evaluation of current accounting information systems, evaluation of potential new systems, to extract data from existing systems from analysis, and examination of emerging technologies which have potential uses in accounting information systems. *(Fall)*

ACCT 6220. Financial Statement Auditing. (3) Analysis of the accounting control systems and the independent auditor's examination of the system and other evidence as a basis for expressing an opinion on financial statements. *(Spring)*

ACCT 6230. Advanced Managerial Accounting. (3) Management's use of and need for accounting information, which is necessary for effective managerial decision-making. Emphasis is on understanding managerial accounting information, specifically its purpose, its effect on managerial behavior, and its use in formulating and implementing strategy. Topics include relevant information for activity and process decisions, and issues involved with management control system's design and operation. *(Fall)*

ACCT 6260. Advanced Financial Accounting I. (3) Advanced concepts and practices in financial reporting with special emphasis on the use of accounting information in capital markets and accounting theory and research. In addition, the course will examine current topics and emerging issues in financial reporting. *(Fall)*

ACCT 6270. Advanced Financial Accounting II. (3) Advanced concepts and practices in financial reporting with special emphasis on business combinations, consolidated financial statements and financial reporting issues and practices for governmental and other not-for-profit entities. In addition, the course will examine current topics and emerging issues in financial reporting. *(Spring)*

ACCT 6290. Accounting Practice. (3) Pre/Co-requisites: ACCT 5230 and ACCT 6260. This course examines business transactions from an integrated perspective. The financial, managerial, systems, assurance, and tax dimensions of common business transactions including, for example, inventory, fixed asset leasing and purchase, executive compensation, debt and equity issuance are considered. In addition new and emerging issues facing the accounting profession are examined. *(Spring)*

ACCT 6299. Topics in Financial Accounting and Auditing. (1-4) This course covers topics in the area of financial accounting and auditing that go beyond the coverage in other existing courses by either addressing new issues or by delving more deeply into a topic. *(On demand)*

BUSINESS ADMINISTRATION

Director

Dr. Casper Wiggins
Associate Dean of Graduate Programs
209 Friday Building
704-687-2569
704-687-2809 (fax)
www.mba.uncc.edu

Degrees

MBA; MBA PLUS Post-Masters Certificate

Graduate Faculty

Accounting

Sak Bhamornsiri, Associate Professor of Accounting
Alan Blankley, Associate Professor of Accounting
Cynthia Blanthorne, Assistant Professor of Accounting
Hughlene A. Burton, Chair and Associate Professor of Accounting
Jack M. Cathey, Associate Professor of Accounting
Nabil Elias, Associate Professor of Accounting
L. Howard Godfrey, Professor of Accounting
Robert E. Guinn, Associate Professor of Accounting
Michele Matherly, Assistant Professor of Accounting
Richard G. Schroeder, Professor of Accounting
Suzanne K. Sevin, Assistant Professor of Accounting

Business Information Systems and Operations Management

Frank C. Barnes, Professor of Operations Management
W. Douglas Cooper, Professor of Operations Management
Abdullah Dasci, Assistant Professor of Operations Management
Moutaz J. Khouja, Chair and Professor of Operations Management
Ram L. Kumar, Associate Professor of Management Information Systems
Gordon H. Otto, Visiting Professor of Operations Management
Baba C. Prasad, Assistant Professor of Management Information Systems
Stephanie S. Robbins, Associate Professor of Management Information Systems
Cem Saydam, Professor of Operations Management
Michael A. Smith, Assistant Professor of Management Information Systems
Anthony C. Stylianou, Associate Professor of Management Information Systems
Chandrasekar Subramaniam, Assistant Professor of Management Information Systems
Susan J. Winter, Assistant Professor of Management Information Systems

Economics

Louis "Ted" Amato, Professor of Economics
John E. Connaughton, Professor of Economics
William Y. Davis, Jr., Professor of Economics
John M. Gandar, Chair and Professor of Economics
Phillip Jeon, Adjunct Lecturer
Hwan C. Lin, Associate Professor of Economics
Gaines H. Liner, Associate Professor of Economics
Ronald A. Madsen, Professor of Economics
Rob Roy McGregor, Associate Professor of Economics
Stanislav I. Radchenko, Assistant Professor of Economics
Benjamin Russo, Associate Professor of Economics
Peter M. Schwarz, Professor of Economics
Ellen M. Sewell, Assistant Professor of Economics
Jennifer Troyer, Assistant Professor of Economics
Hui-Kuan Tseng, Associate Professor of Economics
Richard A. Zuber, Professor of Economics

Finance and Business Law

Lloyd P. Blenman, Associate Professor of Finance
Richard J. Buttimer Jr., Associate Professor of Finance
Steven P. Clark, Assistant Professor of Finance
T. Daniel Coggin, Lecturer in Finance
William F. Kennedy, Associate Professor of Finance
J. Jerome Miller, Lecturer of Business Law
Ben H. Nunnally Jr., Professor of Finance
Steven Ott, Professor of Finance
D. Anthony Plath, Associate Professor of Finance
Judson W. Russell, Adjunct Faculty, Finance and Principal, Global Corporate & Investment Banking Bank of America
Calvin W. Sealey, Chair and The Torrence E. Hemby, Sr., Distinguished Professor in Banking
Louis A. Trosch, Professor of Business Law

Management

Joyce M. Beggs, Associate Professor of Management
Rosemary Booth, Associate Professor of Management
Claudio Carpano, Associate Professor of Management
Richard M. Conboy, Interim Associate Dean for International Programs and Associate Professor of Management
Kent E. Curran, Professor of Management
Frances Fabian, Assistant Professor of Management
Christine Henle, Assistant Professor of Management
I. Edward Jernigan III, Associate Professor of Management
Daryl L. Kerr, Associate Professor of Management
Gary F. Kohut, Professor of Management
John G. Michel, Assistant Professor of Management
Doug Pugh, Assistant Professor of Management
Beth A. Rubin, Associate Professor of Management
Bennett J. Tepper, Professor of Management
Kelly L. Zellars, Assistant Professor of Management

Marketing

Christie H. Amato, Professor of Marketing
Charles D. Bodkin, Associate Professor of Marketing
Fred H. Campbell, Professor of Marketing
Sunil Erevelles, Associate Professor of Marketing
Alan T. Shao, North Carolina Ports Professor of Marketing and International Business

Thomas H. Stevenson, Charles E. Cullen Distinguished Professor of Marketing
Linda E. Swayne, Chair and Professor of Marketing

MASTER OF BUSINESS ADMINISTRATION (MBA)

The primary objective of graduate study in business is to develop candidates for leadership positions in complex organizations. The MBA program focuses on developing the expertise to lead, influence, and persuade others through effective written and spoken communications; the ability to approach complex problems both systematically and imaginatively; the confidence to make decisions in the face of imperfect information, competing objectives, and technological change; the insight to recognize the ethical dimensions of organizational and individual decisions; the sensitivity to recognize that organizational decisions involve teamwork and consensus-building across diverse groups of individuals; and the awareness that business represents an inherently multinational enterprise that exists without geographical or cultural boundaries.

MBA courses are scheduled to accommodate both working professionals and full-time students. Full-time students may enroll in up to four courses each semester, while working professionals normally enroll in two courses each semester. Classes are held in the evening throughout the year on campus and at UNC Charlotte Uptown. A working professional student can complete the program in 24 months. Full-time students may complete the program in four semesters, depending upon scheduling of courses.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Business Administration.

1) A generally satisfactory undergraduate record from an accredited college or university.
2) A satisfactory score on the Graduate Management Admission Test (GMAT).
3) A full resume or a description of significant work experience.

Degree Requirements

The MBA degree program comprises 37 graduate hours, including a Core Functional Component and an Elective Component. Up to 6 hours of course work may be transferred from an AACSB-accredited institution or equivalent, based on a recommendation of the relevant academic department, approval of the Director of the MBA program, and approval of the Graduate School. Necessary preparatory work will be determined during the admissions process, and courses to meet the specific need will be available in the Preparatory Component. All students in the program must meet the Graduate School's requirements for a Master's Degree.

Preparatory Component

Prerequisites (10 credit hours) - These courses may be taken after admission to the MBA. These courses are not required prior to admission to the MBA program. Courses in the MBA Preparatory Component must be completed before enrolling in 6000-level courses except by permission of the Director of the MBA program.

MBAD5112 Foundations of Microeconomics (2)
MBAD5113 Foundations of Macroeconomics (1)
MBAD5131 Fundamentals of Financial Accounting and Financial Management (3)
MBAD5141 Business Statistics (2)
MBAD5142 Quantitative Analysis in Business (1)
MBAD5191 Legal Environment in Business (1)

I. Functional Component (28 hours)

A. Primary Block (13 hours)

Prerequisites: All requirements for admission to the program and Preparatory Component, except as approved by the MBA Director.

MBAD6100 Leadership, Ethics and the Business Environment Seminar (1)
MBAD6112 The Economics of Business Decisions (3)
MBAD6121 Business Information Systems (3)
MBAD6131 Management Accounting (3)
MBAD6141 Operations Management (3)

B. Intermediate Block (12 hours)

Prerequisites: All requirements for admission to the program and the Preparatory Component. Completion of the Primary Block is strongly recommended.

MBAD6152 Financial Management (3)
MBAD6161 Organizational Leadership & Behavior I (3)
MBAD6171 Marketing Management (3)
MBAD6193 International Business Concepts (3)

C. Advanced Block (3 hours)

Prerequisites: All functional courses, listed above, in Primary Block and Intermediate Block should be completed before MBAD 6194 is taken.

MBAD6194 Management Strategy (3)

II. Concentration and Elective Component (9 hours)

Students complete nine hours of elective courses specified for a concentration or as free electives. Students may enroll in electives as soon as they complete the prerequisites for each course. MBAD 6890 (Directed Individual Study) and MBAD 7090 (Special Topics in Business) may be included in a concentration with permission of the MBA Director and the related Department.

Concentration and elective requirements:

Business Finance
Prerequisite: MBAD 6152
Requirement: The following course:
MBAD6157 Theory of Corporate Finance (3)
Plus two of the following courses:
MBAD5159 Student Managed Investment Fund II (3)
MBAD6151 Financial Institutions and Markets (3)
MBAD6153 Investment Management (3)
MBAD6154 Applied Business Finance (3)
MBAD6155 Multinational Finance (3)
MBAD6158 Real Estate Finance and Development (3)
MBAD6159 Real Estate Development (3)
MBAD6160 Real Estate Capital Markets (3)

Economics
Approval of the Department of Economics is required before enrolling in 6000 level ECON courses or the Economics Concentration.
Requirement: The following two courses:
MBAD6111 Macroeconomics and Business Forecasting (3)
ECON6112 Graduate Econometrics (3)
Plus one of the following courses:
ECON6201 Advanced Macroeconomic Theory (3)
ECON6202 Advanced Microeconomic Theory (3)
ECON6218 Advanced Business Forecasting (3)

Financial Institutions/Commercial Banking
Prerequisite: MBAD 6152
Requirement: The following course:
MBAD6156 Commercial Bank Management (3)
Plus two of the following courses:
MBAD5159 Student Managed Investment Fund II (3)
MBAD6058 Special Topics in Financial Services (3)
MBAD6151 Financial Institutions and Markets (3)
MBAD6153 Investment Management (3)
MBAD6154 Applied Business Finance (3)
MBAD6155 Multinational Finance (3)
MBAD6158 Real Estate Finance and Development (3)
MBAD6159 Real Estate Development (3)
MBAD6160 Real Estate Capital Markets (3)

Information and Technology Management
Prerequisite: MBAD 6121
Requirement: The following two courses:
MBAD6201 Data and Knowledge Management (3)
MBAD6202 Business Information Systems Development (3)
Plus one of the following courses:
MBAD6203 Information Systems Economics, Strategy, and Policy (3)
MBAD6204 Business Data Communications (3)

International Business
Prerequisite: MBAD 6193
Requirement: The following three courses:
MBAD6174 International Marketing (3)
MBAD6155 Multinational Finance (3)
MBAD6197 International Business Strategy (3)

Management
Prerequisite: MBAD 6161
Requirement: Three of the following courses:
MBAD6162 Organizational Leadership and Behavior II (3)
MBAD6163 Human Resource Management (3)
MBAD6164 Executive Communication (3)
MBAD6191 Entrepreneurship (3)
MBAD6192 Business and Society (3)
MBAD6195 Strategic Management of Technology (3)
MBAD6196 Strategic Planning (3)
MBAD6197 International Business Strategy (3)

Marketing
Prerequisite: MBAD 6171
Requirement: Three of the following courses:
MBAD6172 Marketing Research (3)
MBAD6173 Promotional Strategy (3)
MBAD6174 International Marketing (3)
MBAD6175 Logistics Management (3)
MBAD6176 Consumer Behavior (3)

Real Estate Finance & Development
Prerequisite: MBAD 6152
Requirement: The following two courses:
MBAD6158 Real Estate Finance & Investment (3)
MBAD6159 Real Estate Development (3)
Plus one of the following courses:
MBAD6160 Real Estate Capital Markets (3)
MBAD6258 Site Feasibility Analysis (3)
MBAD6259 Applied Real Estate Development (3)

Supply Chain Management
Prerequisite: MBAD 6141
Requirement: The following two courses:
MBAD6122 Technology-Enhanced Decision Making
MBAD6208 Supply Chain Management
Plus one of the following courses:
MBAD6142 Quality and Manufacturing Management
A department approved elective

Student Structured Concentration
Students may propose a nine-semester hour, three-course concentration in a significant area of interest for approval by the Director of the MBA program. This concentration may include graduate courses from other programs within the University with approval of the related Department.

Admission to Candidacy
An Application for Admission to Candidacy form listing graduate-level courses that apply to the degree must be submitted to the MBA Office four weeks prior to the start of the semester in which the student plans to complete the course work for the degree.

Application for Degree
An Application for Degree form must be submitted to the Graduate School by the published deadline.

Assistantships
A limited number of assistantships are available each year. In order to be competitive, applications should be submitted by March 15. Additional information is available in the MBA office and the Graduate School website.

Advising
Advising is done by the Director and Associate Director for the MBA Program.

Transfer Credit
Up to six hours of appropriate graduate credit may be accepted for transfer from another AACSB-accredited (or equivalent) MBA program. Only courses where grades of "B" or better have been earned will be considered. Approval of the Program Director or Associate Director and the Graduate School is also required. All other Graduate School policies regarding transfer credit apply.

Program Certifications/Accreditation
The MBA Program and all degree and certificate programs offered by The Belk College of Business are accredited by the Association to Advance Collegiate Schools of Business (AACSB-International).

MBA PLUS POST-MASTERS GRADUATE CERTIFICATE

The MBA PLUS Post-Masters Graduate Certificate program provides an opportunity for graduates of AACSB-accredited MBA programs to broaden and update their business education. As business conditions, tools, and techniques change rapidly, a major way of staying at the forefront of knowledge is through additional university education. The MBA PLUS Certificate makes courses in the Belk College's MBA Concentrations available to persons who already have MBA degrees.

Admission Requirements
Applicants must satisfy the general requirements established by the Graduate School for admission to a graduate certificate program. Applicants must provide two official transcripts indicating the awarding of an MBA degree from an AACSB-accredited institution or equivalent, along with the Graduate application and application fee. (Graduates from the MBA program at UNC Charlotte are not required to send an official transcript.) Applicants will not be required to retake the GMAT.

Completion Requirements
The MBA PLUS Certificate requires completion of twelve or more semester hours of 6000-level courses. At least nine hours must be electives. One 3-hour course may be a repeat of a course previously taken. A student may repeat more courses, but only one such repeated course will be counted toward the certificate. The nine-hour elective requirement of the MBA PLUS corresponds to the nine-hour concentrations in the MBA program.

It is expected that most students will use their twelve hours or more to gain a concentration in a particular functional area of interest. However, a broader program that draws from a number of areas may be pursued.

Transfer credits are not accepted in the MBA PLUS Certificate program. To receive the certificate, students must complete all courses with a grade of "B" or better within four years from the time of enrollment in the first certificate course.

An Application for Candidacy for a Graduate Certificate (candidacy form) and an Application for Certificate should be completed prior to the last semester of MBA PLUS course work. Consult Graduate School published deadlines.

MBA INTERNATIONAL PROGRAMS

The Belk College of Business in partnership with the Graduate School of Business and Leadership (EGADE) at Tec de Monterrey, Mexico offers a dual degree program where a student may earn the Belk MBA and a Master of Administration from EGADE. This is a full-time, cohort based program, with all coursework taught in Mexico. Courses are taught in English. Students interested in more information about this program should contact the Associate Dean for International Programs office.

Courses In Business Administration

MBA Program Preparatory Courses

MBAD 5112. Foundation of Microeconomics. (2)
This course focuses on topics related to the scope and methodology of economics as a social science, the analysis of markets, the development of market structure, the characteristics of market failure, problems of economic concentration, and the theory of income

distribution. Enrollment is limited to admitted MBA students. *(Fall, Spring)*

MBAD 5113. Foundation of Macroeconomics. (1) This course focuses on topics related to the scope and methodology of economics as a social science, the measurement of national income, the theory of national income determination, money and banking, monetary and fiscal policy, and international economics. Enrollment is limited to admitted MBA students. *(Fall, Spring)*

MBAD 5131. Fundamentals of Financial Accounting and Financial Management. (3) Accelerated and in-depth study of conceptual foundations and applications of financial accounting and financial management with emphasis on building accounting and finance information bases for external decision making. (Accounting and finance preparation to enter the MBA. May not be taken for credit toward any undergraduate degree within the Belk College of Business Administration or used as equivalent credit for ACCT 2121-2122). Enrollment is limited to admitted MBA students. *(Fall, Spring)*

MBAD 5141. Business Statistics. (2) This course is designed to bring MBA students up to an acceptable level of analytical capability in the areas of probability theory and business statistics. Enrollment is limited to admitted MBA students. *(Fall, Spring)*

MBAD 5142 . Quantitative Analysis in Business. (1) This course is designed to bring MBA students up to an acceptable level of analytical capability in the areas of basic linear mathematics (algebra and matrix algebra) and basic differential and integral calculus. Enrollment is limited to admitted MBA students. *(Fall, Spring)*

MBAD 5191. Legal Environment in Business. (1) Legal environment in which business operates today; Legal, social, and ethical considerations of managers within the framework of federal and state regulatory laws; role and function of federal regulatory agencies and their impact on business activities. Enrollment is limited to admitted MBA students. *(Fall, Spring)*

Graduate Only

MBAD 5158. Student Managed Investment Fund I. (3) Prerequisites: FINN 3120 or MBAD 6152, and FINN 3222 or FINN/MBAD 6153. Management of an actual portfolio consisting of a portion of the University's Endowment Fund. Admission is by permission of instructor. Students selected for the course are required to take MBAD 5159. (Same as FINN 5158) *(Fall)*

MBAD 5159. Student Managed Investment Fund II. (3) Prerequisites: FINN 3120 or MBAD 6152, and FINN 3222 or FINN/MBAD 6153. Management of an actual portfolio consisting of a portion of the University's Endowment Fund. Admission is by permission of instructor. Student cannot enroll in this course without successfully completing MBAD 5158. (Same as FINN 5159) *(Spring)*

MBAD 6028. Topics in Business Information Systems. (3) Prerequisite: MBAD 6121. Selected topics in information systems. Potential topics include information resource management, database management systems, management support systems, information systems in the financial and banking industry, information systems in manufacturing, information systems in health care, and EDP auditing. May be repeated for additional credit as the topics vary and with permission of MBA director. *(On demand)*

MBAD 6058. Special Topics in Financial Services. (3) Prerequisite: MBAD 6152. Each year, the subject matter of this course deals with a different specialized and contemporary topic of interest to students who are preparing for management careers in the financial services industry. The topics are chosen and covered in a way that builds on and supplements the topics covered in other courses in the Financial Institutions/Commercial Banking concentration. Emphasis is placed on the managerial implications of the subject matter as well as the impact on the financial system. Topics covered in this course may vary from semester to semester, and the course may be repeated a maximum of one time for academic credit. *(On demand)*

MBAD 6100. Leadership, Ethics, and the Business Environment Seminar. (1) Prerequisite: None. An introduction to leadership, ethics, and other essential skills and concepts for success in the current business environment. The particular topics and activities included will vary each semester as the business environment changes. This course is to be taken by MBA students in their first semester. *(Fall, Spring)*

MBAD 6111. Macroeconomics and Business Forecasting. (3) Prerequisite: MBAD 5112, 5113, 5141, and 5142 or equivalents. Advanced studies of the interrelations of markets in national and international economies; mechanisms of monetary policy and interest rate effects, foreign exchange rates and inflation; relations between national saving, fiscal policy, foreign debt and investment; short-run and long-run effects of economic policy; tax policy, government spending and economic growth; types of economic forecasts; value and limits of forecasts. *(On demand)*

MBAD 6112. The Economics of Business Decisions. (3) Prerequisites: MBAD 5112, 5113, 5141, and 5142 or equivalents. Economic concepts in the decision-making process. Topics include scarcity; marginal analysis and tools of optimization; demand and supply analysis and market structure; economic efficiency; regression analysis; risk analysis and game theory; and international issues. *(Fall, Spring)*

MBAD 6121. Business Information Systems. (3) Prerequisite: Basic computer knowledge and skills are assumed. Examination of how information systems are developed and used in organizations, how information resources are managed, and the potential strategic and competitive impact information systems have in domestic and global business environments. *(Fall, Spring)*

MBAD 6122. Technology-Enhanced Decision Making. (3) Prerequisite: MBAD 5141 and 5142 or equivalents. An analytical approach to the management process. Generalized models for decision making with major emphasis on application of the scientific method to management problems. *(Spring)*

MBAD 6123. Applied Management Science. (3) Prerequisite: MBAD 6122. Mathematical model building aimed at integrating methods and applications. Overview of mathematical programming in practice and a series of projects implementing models in business and the public sector. *(On demand)*

MBAD 6131. Managerial Accounting. (3) Prerequisite: MBAD 5131 or equivalent. This course deals with using accounting information for strategic, tactical, and operating decisions with a focus on strategic cost management. Emphasis is on using cost and other management accounting information in making sound decisions, its effect on managerial behavior, and its use in formulating and implementing strategy, and issues of design and operation of management control systems including the intended and unintended consequences of performance measurement. *(Fall, Spring)*

MBAD 6141. Operations Management. (3) Prerequisite: MBAD 5141 and MBAD 5142 or equivalents. Design, operation, and control of service and manufacturing systems. Emphasis on using analytical tools for problem solving in process analysis and re-engineering, work-force management, material and inventory management, aggregate planning, total quality management, and others. *(Fall, Spring)*

MBAD 6142. Quality and Manufacturing Management. (3) Prerequisite: MBAD 6141. Current issues and advances in operations management including just-in-time inventory management, total quality management, continuous improvement, flexible manufacturing systems, computer integrated manufacturing systems, technology evaluation and selection, and operations strategy. *(Fall)*

MBAD 6151. Financial Institutions and Markets. (3) Prerequisite: MBAD 6152. Major financial institutions, particularly commercial banks, and their role in the intermediation process and as suppliers of funds to the money and capital markets. Comparative financial policies of these institutions are examined in the context of their legal and market environment. (Same as FINN 6151) *(Yearly)*

MBAD 6152. Financial Management. (3) Theory and practice of corporate finance including asset management, cost of capital and capital budgeting, optimization problems and socio-economic aspects of financial management. Computer technology may be employed when applicable. (Same as FINN 6152) *(Fall, Spring)*

MBAD 6153. Investment Management. (3) Prerequisite: MBAD 6152. Theory and practice of investment decisions of individuals and fund managers. Topics include the status of capital market theory, the efficient market hypothesis literature, and a portfolio performance measurement. Standard institutional and investment analysis topics, futures and options markets, and international investment topics are covered. (Same as FINN 6153) *(Yearly)*

MBAD 6154. Applied Business Finance. (3) Prerequisite: MBAD 6152. Examination of business finance topics which typically confront the firm's primary finance functional areas (CFO, Treasurer, Controller). The purpose is to develop advanced analytical skills in those topic areas. The following topics form the basis of the course: lease vs buy (borrow); leveraged buy-outs: merger analysis (emphasis on valuation); international operations of American firms (capital budgeting and cost of capital); capital structure; risk management. Such additional topics as working capital management; risk management; and relevant current topics will be included as time permits. (Same as FINN 6154) *(On demand)*

MBAD 6155. Multinational Financial Management. (3) Prerequisites: MBAD 6152. Financial management of the multinational firm including management of foreign exchange risk and political risk, and the control and evaluation of financial policies of multinational firms. (Same as FINN 6155) *(Yearly)*

MBAD 6156. Commercial Bank Management. (3) Prerequisite: MBAD 6152. Techniques for the management of commercial banks. Topics of study include industry structure, administrative organization, management of assets, liabilities, and capital, and financial analysis of the banking firm. (Same as FINN 6156) *(Yearly)*

MBAD 6157. Theory of Corporate Finance. (3) Prerequisite: MBAD 6152. Theories of modern corporate finance, including theory of efficient capital markets; uncertainty and the theory of choice; market equilibrium asset pricing models (capital asset pricing model, arbitrage pricing theory, Black-Scholes); theories of capital structure and the cost of capital; dividend policy; and leasing. (Same as FINN 6157) *(Yearly)*

MBAD 6158. Real Estate Finance and Investment. (3) Prerequisite: MBAD 6152. This course focuses on the techniques used to analyze, finance and structure real estate transactions. Topics include: an overview of the

real estate space and capital markets; the techniques of financial analysis; project ownership, taxation and financial structure; determining the financial feasibility of real estate development; and corporate real estate strategies. *(Yearly)*

MBAD 6159. Real Estate Development. (3) Examination of the real estate development process. Identification and evaluation of the critical assumptions and issues related to market and site feasibility, financial feasibility, planning, acquisition, construction, and operation of economically viable commercial real estate projects. (Same as GEOG 6103) *(Yearly)*

MBAD 6160. Real Estate Capital Markets. (3) Prerequisite: MBAD 6152. This course focuses on the techniques used to analyze, finance and structure real estate transactions, and emphasizes the role of the capital markets in facilitating development and investment in commercial real estate. Topics include: real estate in an investment portfolio; valuation and investment analysis for direct (private) real estate equity investment including coverage of valuation using real option methodology; primary and secondary commercial mortgage markets (CMBS); and, analysis of publicly traded equity real estate investment trusts (REITs). *(Yearly)*

MBAD 6161. Organizational Leadership and Behavior I. (3) Behavioral knowledge and skills essential to becoming an effective manager/leader including behavior and motivation in an environment of complexity and rapid change and ethical implications of actions and their effects on demographically diverse and increasingly international work force. *(Fall, Spring)*

MBAD 6162. Organizational Leadership and Behavior II. (3) Prerequisite: MBAD 6161. Continuation of MBAD 6161. Examines performance determinants and appraisal, design of complex organizations, team building, organizational change, career development and conflict management. *(On demand)*

MBAD 6163. Human Resource Management. (3) Prerequisite: MBAD 6161. An examination of the current critical issues and strategic questions associated with managing employees. Case material, readings and audiovisual material will be used to stimulate discussion of the most important and strategic questions to be tackled by general managers today and in the future in the relationship between management and workers. *(Yearly)*

MBAD 6164. Executive Communication. (3) Intensive study of communication in organizations from middle and upper management perspectives with special attention to corporate communication, media relations, technologically mediated communication, crisis communication and public affairs. Case studies, readings and project assignments will be used in a variety of business situations. *(Yearly)*

MBAD 6171. Marketing Management. (3) A managerial approach to strategic marketing decision-making. Topics include promotional strategy, channels of distribution, demand analysis and pricing, e-marketing, and international marketing. Case studies, readings and simulations are used. *(Fall, Spring)*

MBAD 6172. Marketing Research. (3) Prerequisite: MBAD 6171. Planning, execution and evaluation of marketing research activities. Emphasis on the techniques and methodology used in the collection, analysis and interpretation of economic, demographic and sociological data for use in marketing decision making. *(Fall)*

MBAD 6173. Promotional Strategy. (3) Prerequisite: MBAD 6171. Opportunities and challenges for an organization through advertising, personal selling, sales promotion and publicity. It includes analysis of the legal and ethical problems involved in this area. Case studies and a project assignment are used. *(Spring)*

MBAD 6174. International Marketing. (3) Prerequisite: MBAD 6171. Study of opportunities, problems and techniques involved in marketing internationally. Analysis of environmental forces which affect international marketing and the methods companies utilize to market effectively on an international scale. *(Spring)*

MBAD 6175. Logistics Management. (3) Prerequisite: MBAD 6171. Study of the logistics system as a source of profitability and competitive advantage. Component activities (customer service, inventory, storage, transportation) are examined individually and as parts of a larger whole, with emphasis on effective management of the overall system of finished goods distribution. Special attention is given to managing the transportation function in a deregulated environment. *(On demand)*

MBAD 6176. Consumer Behavior. (3) Prerequisite: MBAD 6171. Graduate standing or permission of department. The consumer is the central focus of all business activity. This course is designed (a) to understand people's consumption-related behaviors, and (b) to develop and evaluate marketing strategies to influence those behaviors. Concepts from the behavioral sciences will be analyzed from the perspective of the marketing manager, and will be used to develop dynamic and effective marketing strategies. *(Yearly)*

MBAD 6181. E-Business Concepts. (3) Prerequisite: MBAD 6121. An overview of the business practices and strategies used to compete in the new inter-networked global marketplace. Critical, technical, and managerial issues relating to establishing and maintaining a competitively successful E-Business are explored. *(On demand)*

MBAD 6182. E-Business Systems. (3) Prerequisites: MBAD 6181 and a programming language such as Visual Basic, C, C++, or Java. A study of the evolving business information systems facilitating electronic commerce. This course provides the basic skills required to develop successful E-Business systems. The course uses hands-on lab sessions, classroom demonstrations, on-line resources, and individual and group projects that include self-learning. *(On demand)*

MBAD 6183. E-Business Marketing. (3) Prerequisites: MBAD 6182 and MBAD 6171. This course integrates marketing analysis and issues with the design and implementation of E-Business marketing programs. Major topics include customer behavior (business to business and business to consumer), marketing strategy (targeting, positioning, and marketing mix) with an emphasis on marketing channels and communications problems/opportunities arising from the application of internet technologies. An E-Business marketing plan will be developed. *(On demand)*

MBAD 6189. E-Business Strategy. (3) Prerequisites: MBAD 6182 and MBAD 6183. E-Business Strategy is designed to integrate the business concepts and environmental issues that are essential for success in today's commercialized Internet setting. The course will consider the opportunities and problems posed by E-Business through the application of analytical models and case studies. This course addresses the changed priorities in strategic management resulting from the emergence of the Internet by emphasizing those strategic management concepts that are not the focus of traditional strategy core classes. *(On demand)*

MBAD 6191. Entrepreneurship. (3) Prerequisites: MBAD 6131, 6152, 6171, or permission of the MBA director. An examination of entrepreneurship and entrepreneurs. Focus on planning the start-up of a fast-growth enterprise with the aim of rewarding the founders and initial investors with significant capital gains. Extensive use of case studies will provide a background of classroom activities to assist students in the preparation of a detailed plan for the hypothetical start-up of a fast-growth firm. *(On demand)*

MBAD 6192. Business and Society. (3) Ethical, moral, political and social aspects of policy formulation and implementation. Management's responsibilities to consumers, employees, investor/owners, and society are stressed. Case studies are used. *(Yearly)*

MBAD 6193. International Business Concepts. (3) Prerequisites: MBAD 6152, 6171, or permission of the MBA director. An overview of international business management. Specifically, the functional areas of business are covered to provide an international perspective. *(Fall, Spring)*

MBAD 6194. Management Strategy. (3) Prerequisite: All courses in the primary and intermediate block of the Functional Component or permission of the Director of the MBA program. Examination of the need to integrate the functional activities of the firm in planning corporate objectives and achieving operating results. Emphasis on ability to identify issues and problems of the firm as a whole, to explore alternatives and to make decisions which recognize the interrelationships of the functional specialties within the total organization. Application and integration of knowledge and skills of analysis developed in the preceding courses of the MBA program. *(Fall, Spring)*

MBAD 6195. Strategic Management of Technology. (3) Prerequisites: MBAD 6141, 6152, and 6171. Impact of changing technology upon industries and companies and the consequent challenges for business managers. Major topics include: the historical context of change and innovation; organization and innovation; technology and business strategy; impact on functional areas; managing linkages; venturing and organization learning; government influence on innovation; executive leadership; the management of innovation and change. A comprehensive written report covering a significant aspect of emerging technology is required. *(On demand)*

MBAD 6196. Strategic Planning. (3) Prerequisite: Permission of instructor. Strategic planning within a rapidly changing environment including changing industry conditions as well as technological, social, political and economic changes. Examination of strategic planning techniques being developed by researchers and by corporate practitioners. *(On demand)*

MBAD 6197. International Business Strategy. (3) Prerequisites: MBAD 6152 and 6171. Management challenges associated with the development of international strategies and the management of organizations in business enterprises whose operations stretch across national boundaries; how multinational enterprises (MNEs) work. Case studies, projects, and presentations are used to help students apply concepts and theories. *(Yearly)*

MBAD 6198. Professional Applications. (3) Prerequisites: Completion of the Functional Component. Team-taught, multidisciplinary course based on (1) structured, written cases and (2) contemporary management problems/issues presented in a non-structured, non-case format. Requires formal written position papers evaluating current business problems which are presented and defended before an audience of peers, faculty members, and business leaders. *(On demand)*

MBAD 6201. Data and Knowledge Management in Business. (3) Prerequisite: MBAD 6121 or consent of the department. An overview of the business approach to identifying, modeling, retrieving, sharing, and evaluating an enterprise's data and knowledge assets.

Covers the organizational, technological and management perspectives. *(Fall)*

MBAD 6202. Business Information Systems: Analysis, Design, and Management. (3) Prerequisites MBAD 6121 or consent of the department. Examination of managerial issues associated with the study of business processes and the development of supporting information systems. Emphasis on the application of appropriate methodologies, techniques, and tools to analyze, design, and implement business information systems. Study of relevant IS project management and quality assurance techniques. *(Spring)*

MBAD 6203. Information Systems Economics, Strategy and Policy. (3) Prerequisite: MBAD 6121 or consent of the Department. This course examines a collection of topics that deal with the strategic use of information systems. These topics include Business Value of IS, Network Economics, use of IS for competitive advantage, IS Planning and policy setting, IS evaluation selection and sourcing. *(Fall)*

MBAD 6204. Business Data Communications. (3) Prerequisites: MBAD 6121 or consent of the department. Examination of the information communication requirements of business environments, the fundamentals of communication technology, and the application of the technology for solving business problems. Emphasis on understanding communication technologies to assess needs, plan for the introduction of hardware and software, and manage these communication systems. *(Spring)*

MBAD 6208. Supply Chain Management. (3) Prerequisites: MBAD 6141 or consent of the Department. Supply chain management is concerned with all of the activities performed from the initial raw materials to the ultimate consumption of the finished product. From a broad perspective, the course is designed to examine the major aspects of the supply chain: the product flows; the information flows; and the relationships among supply chain participants. The course content is interdisciplinary in nature and will cover a variety of topics such as supply chain information technologies, supply chain design, strategic alliances between supply chain participants and supply chain initiatives. *(Spring)*

MBAD 6258. Site Feasibility Analysis. (3) Prerequisites: consent of instructor. Examination of factors affecting the feasibility of land parcels for commercial and residential development with emphasis on the physical evaluation of a given site, the market support for its intended use and the financial support for the proposed development. (Same as GEOG 6102) *(Fall)*

MBAD 6259. Applied Real Estate Development. (3) Prerequisite: MBAD 6159, GEOG 6103, or ARCH 5068. This course focuses on the application of the processes involved in real estate development. Students will work in groups on a semester project to select a site and prepare an appropriate development plan that emphasizes the market and financial feasibility of the real estate development. (Same as GEOG 6105 and ARCH 5069) *(Yearly)*

MBAD 6500. Cooperative Education Experience. (0) Prerequisite: Completion of nine hours of graduate coursework. Participation in the Co-op program enables MBA students to pursue practical work experience that is complementary to their major course of studies. Each student's program must be approved by the director of the MBA program. *(Fall, Spring)*

MBAD 6890. Directed Individual Study. (3) Directed individual study and in-depth analysis of a special area of management, economics, business or accounting. The course may be used to satisfy up to six semester hours of graduate credit requirements in the Master of Business Administration degree program and may be repeated for credit provided a different area of study is undertaken each time. Permission of a member of the graduate faculty who would direct the study and permission of the MBA director must be secured before registering for the course. *(Fall, Spring)*

MBAD 7090. Special Topics in Business. (1-4) This course covers special topics in any of the functional areas of business. Topics will vary. May be repeated for credit for different topics. *(On demand)*

MBAD 7999. Master's Degree Graduate Residence. (1) See Department for more information.

ECONOMICS

Department of Economics

220 Friday Building
704-687-2185
http://www.belkcollege.uncc.edu//economics/MS/ms.htm

Degree

M.S.

Coordinator

Rob Roy McGregor III, rrmcgreg@email.uncc.edu

Graduate Faculty

Louis H. Amato, Professor
John E. Connaughton, Professor
W. Young Davis, Professor
John M. Gandar, Professor
B. Philip Jeon, Adjunct Lecturer
Hwan C. Lin, Associate Professor
Gaines H. Liner, Associate Professor

Ronald A. Madsen, Professor
Rob Roy McGregor III, Associate Professor
Stanislav Radchenko, Assistant Professor
Benjamin Russo, Associate Professor
Peter M. Schwarz, Professor
Ellen Sewell, Assistant Professor
Jennifer L.Troyer, Assistant Professor
Hui-Kuan Tseng, Associate Professor
Richard A. Zuber, Professor

MASTER OF SCIENCE IN ECONOMICS

The Master of Science degree program in Economics features a curriculum that is flexible yet thorough in its approach to theoretical training and applied course work. The program offers concentrations in Economics and in Economics/Finance. Students completing this program are prepared for analytical and management positions that require the integration of economic analysis and advanced quantitative methods. Employment opportunities for economists with a master's degree exist in both the public and private sectors. In addition, students with a master's degree may choose to pursue additional graduate education leading to a doctoral degree in Economics or in Finance.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Economics:

1) Undergraduate coursework that includes: Calculus, Econometrics (or equivalent), Intermediate Macroeconomic Theory, Intermediate Microeconomic Theory, and Mathematical Economics. (Students missing some of these courses can be admitted conditionally.)
2) A satisfactory score on the aptitude portions of the Graduate Record Examination. The Graduate Management Aptitude Test may be substituted for the GRE with the permission of the program coordinator.

Degree Requirements

The program leading to the Master of Science degree in Economics requires at least 30 hours of graduate credit, with a maximum of six hours of transfer credit accepted from an accredited institution. (Credit applied toward an awarded graduate degree will not be accepted as transfer credit.) Courses taken at other accredited institutions after enrollment may receive residence credit if approved by the department and the Dean of the Graduate School. All credit hours applied toward the degree must be in courses open only to graduate students. No more than two C's are permitted in the program and at least 18 semester hours must be completed before admission to candidacy. A GPA of at least 3.0 is required to graduate.

The program is organized into three curriculum components:

1) a core curriculum in economic theory and quantitative methods;
2) a concentration to be selected from one of the two described below; and
3) a research project or thesis.

Admission to Candidacy Requirements

An Admission to Candidacy form listing graduate-level courses that apply to the degree must be submitted to the program coordinator one month prior to the semester in which the student plans to complete the course work for the degree.

Assistantships

A number of graduate assistantships are available each year. To be fully competitive, applications must be submitted by March 15. Contact the coordinator for further information.

Core Courses

ECON6201	Advanced Macroeconomic Theory (3)
ECON6202	Advanced Microeconomic Theory (3)
ECON6112	Graduate Econometrics (3)
ECON6218	Advanced Business and Economic Forecasting (3)

In addition, students who choose to complete a thesis must successfully complete six hours of ECON 6999 (Master's Thesis), while students enrolled in the non-thesis option must complete ECON 6901 and ECON 6902 (Research Methods I and Research Methods II).

Concentrations

1) Economics

The purpose of the economics concentration is to provide students with the opportunity to acquire specialized theoretical skills related to their areas of interest and expertise. This concentration can be completed in one full year of study.

Students in this option must complete the core curriculum for the M.S. in Economics and the thesis or research project. In addition, they must complete 12 hours of electives chosen from the fields of macroeconomics and monetary policy, finance and banking, environmental economics, international trade and international finance, economic modeling and simulation, urban economics, public finance and cost/benefit analysis, or economic and business forecasting. The program also permits the development of individualized specializations in areas that are complementary to economic theory and analysis.

2) Economics/Finance

There are two options available in the Economics/Finance Concentration: the Financial Management Option and the Quantitative Finance Option.

i. Financial Management Option
The Financial Management Option is designed for students interested in pursuing careers in corporate finance or financial planning. This option can be completed in one full year of study.

Students in this option must complete the core curriculum for the M.S. in Economics and the thesis or research project. In addition, they must complete

FINN6152	Financial Management (3) (Prerequisite: MBAD 6131 or 6 hours of undergraduate accounting and approval of the program coordinator)
FINN6153	Investment Management (3)
FINN6157	Theory of Corporate Finance (3)
and one of the following:	
FINN6155	Multinational Financial Management (3)
ECON6235	Monetary and Financial Theory (3)
OR	An Approved Elective.

ii. Quantitative Finance Option
The Quantitative Finance Option is designed for students interested in pursuing careers in portfolio management or financial risk management. The Quantitative Finance Option can also provide an excellent foundation for students who wish to pursue additional graduate study leading to a doctoral degree in Finance. This option can be completed in one and a half years.

Students in this option must complete the core curriculum for the M.S. in Economics and the thesis or research project. In addition, they must complete

ECON6203	Financial Economic Theory (3)
ECON6219	Financial Econometrics (3)
FINN6210	Derivatives I: Financial Elements of Derivatives (3)
and one of the following:	
FINN6211	Risk Management and Fixed Income Derivatives (3)
ECON6235	Monetary and Financial Theory (3)
OR	An Approved Elective.

Minors
The Department of Economics also participates in the program leading to an interdisciplinary graduate minor in Operations Research. See Operations Research Section of this Catalog for complete information and program requirements.

Advising
Prior to, or concurrent with, the first semester of study, each student will be expected to complete a program of study listing each class the student expects to take as a part of the program. The program of study requires the approval of the coordinator.

Thesis
Students who choose the thesis track must successfully complete six hours of ECON 6999 (Master's Thesis). The thesis must be written and defended within six calendar years after admission into the M.S. in Economics program. The Thesis Committee, which must be approved by the program coordinator, will consist of a Chair and at least two other faculty members. ECON 6999 is graded on an A, B, C or U basis.

Application for Degree
An Application for Degree form must be completed and submitted with the graduation fee to the Registrar's Office by the published deadline.

Tuition Waivers
A limited number of in-state and out-of-state tuition waivers are made available each year. These waivers are competitively awarded using the same application required for assistantships.

Program Certifications/Accreditations
The Belk College of Business is accredited by the Association to Advance Collegiate Schools of Business (AACSB).

Courses in Economics

ECON 5116. Public Sector Economics. (3) Revenue and expenditure problems of governmental units, intergovernmental financial relationships and the impact of federal fiscal policy upon the American economy. *(On demand)*

ECON 5135. Economics of Growth and Development. (3) Theories of economic growth and development applied to varying economic and social systems. Current theoretical models and their relevance to efficient allocation of resources to both the developed and the developing nations. *(On demand)*

ECON 5160. Economics of Transportation. (3) Analysis of transportation systems. Topics include the historical development of various modes, costs and rate-making, regulation and national transportation policy. *(On demand)*

ECON 5171. Economics of International Trade. (3) Theory of international trade including determination of international trade patterns, welfare implications of international trade, economic integration, and effects of tariffs and quotas. *(On demand)*

ECON 5172. Economics of International Finance. (3) Survey of international monetary theory. Topics include exchange rate determination, balance of payments and adjustment, international liquidity, capital

movements, international financial organizations, and monetary reform proposals. *(On demand)*

ECON 5180. Industrial Organization and Public Policy. (3) An examination of monopolistic competition, oligopoly, and monopoly and questions of public policy in dealing with problems created by industrial concentration. *(Spring, Summer)*

ECON 5181. Energy and Environmental Economics. (3) Economic issues of both energy and environment. Energy issues include the historical development of energy resources, supply and demand considerations, and projections of the future energy balance. Environmental issues are externalities, common property resources, and government regulation. Policy considerations include environmental standards, pollution charges, and property rights. Cost-benefit analysis and microeconomic theory are applied. *(On demand)*

ECON 6001. Advanced Topics in Macroeconomics. (3) Prerequisites: ECON 6112, 6201 and 6202. Advanced treatment of selected issues in macroeconomics. *(On demand)*

ECON 6002. Advanced Topics in Microeconomics. (3) Prerequisites: ECON 6112, 6201 and 6202. Advanced treatment of selected issues in microeconomics. *(On demand)*

ECON 6090. Topics in Economics. (1-3) Prerequisite: consent of the department. Topics from various areas of economics. Credit hours will vary with the topic offered. May be repeated for credit as topics vary. *(On demand)*

ECON 6100. Graduate Mathematical Economics. (3) Economic problems are analyzed with quantitative techniques. Topics covered include the study of economic growth models, utility maximization, homogeneous functions, dynamic systems, applications of linear programming, and constrained optimization. *(On demand)*

ECON 6112. Graduate Econometrics. (3) Prerequisites: Admission to graduate program and permission of program coordinator. Advanced study of the theory and application of statistics to economic problems. Topics include derivation of least-squares estimators; maximum likelihood estimation; and problems of multicollinearity, heteroskedasticity, and autocorrelation. *(Fall)*

ECON 6201. Advanced Macroeconomic Theory. (3) Prerequisites: Admission to graduate program and permission of program coordinator. Theories of aggregate income determination, inflation, unemployment, interest rates and economic growth; macro-economic consumption and investment behavior; the business cycle. *(Fall)*

ECON 6202. Advanced Microeconomic Theory. (3) Prerequisite: Admission to graduate program and permission of program coordinator. Theories of the firm, of the consumer, and of resource owners; determination of prices under different market structures; general equilibrium analysis and welfare economics. *(Fall)*

ECON 6203. Financial Economic Theory. (3) Prerequisites: Admission to the graduate program and permission of the program coordinator. Review of financial economic theory using discrete-time models. Topics include: risk measurement; choices under uncertainty; portfolio selection; capital asset pricing model (CAPM); Arrow-Debreu pricing; options and market completeness; the Martingale measure; arbitrage theory; consumption based CAPM; and valuation of the firm. *(Fall, Spring)*

ECON 6218. Advanced Business and Economic Forecasting. (3) Prerequisite: ECON 6112. Develops forecasting techniques used in business decision making and techniques used in forecasting macroeconomic variables. Topics include: estimation, identification and prediction using ARMAX, state space, and Box-Jenkins models; spectral analysis; linear filtering. *(Spring)*

ECON 6219. Financial Econometrics. (3) Prerequisite: ECON 6218 or MATH 6201. Advanced time series with financial applications. Topics include: time series regressions (univariate and multivariate, stationary and non-stationary) and time series models (including ARMA, ARCH, GARCH, stochastic volatility and factor models). The emphasis will be on model properties, estimators, test statistics, and applications in finance. *(Fall or Summer)*

ECON 6235. Monetary and Financial Theory. (3) Prerequisites: ECON 6112 and either ECON 6201 or 6202. Theory and empirical tests of money supply, money demand, and financial markets; portfolio theory with special attention to portfolio choices of banks; term structure of interest rates; dynamic models of money and economic activity. *(On demand)*

ECON 6240. Economics of International Finance. (3) Prerequisites: ECON 6112, 6201 and 6202. Open economy macroeconomics, international transmission of inflation and unemployment, internal and external balance; balance of payments and international payments mechanisms; determination of exchange rates and effects of hedging and speculation. *(On demand)*

ECON 6241. Economics of International Trade. (3) Prerequisites: ECON 6112, 6201 and 6202. Examines the causes and consequences of trade using Ricardian and neoclassical models. Considers extensions, modifications, and empirical tests of these models. Analysis of tariffs, quotas, other trade restrictions, export subsidies, and trends in current trade policy. *(On demand)*

ECON 6250. Advanced Urban and Regional Economics. (3) Prerequisite: Admission to graduate program. Applications of microeconomic theory to problems of cities, metropolitan areas and regions; methods in regional analysis, location theory, land-use planning, measurement of economic activity; transportation, housing, poverty, and growth issues. *(Spring)*

ECON 6255. Benefit-Cost Analysis. (3) Principles, practices, and applications for defining and comparing the benefits and costs of public policy programs and private sector projects, including techniques useful for organizing and analyzing data, evaluating programs systematically, and developing a framework for decision making while recognizing ethical implications, measurement problems, and time value problems. *(On demand)*

ECON 6800. Directed Study in Economics. (1-3) Prerequisite: Admission to graduate program. Independent study of a theoretical and/or a policy problem in a special area of economics. Topics of the investigation may originate from the student or from the faculty member supervising the study. May be repeated for up to 6 hours of credit with the approval of the program coordinator. *(On demand)*

ECON 6901. Research Methods for Economists I. (3) Prerequisites: ECON 6112, 6202 and either ECON 6201 or ECON 6203. Research programs in economics; problem identification; interpretation of statistical results; bibliographic search; data sources and collection; selection of statistical technique; preparation of reports and proposals. *(Spring)*

ECON 6902. Research Methods for Economists II. (3) Prerequisite: ECON 6901. Critique of economic research and reports, presentation of econometric results and reports. The student will develop a research project, perform statistical tests, and present the results orally and in a major research paper. *(Summer)*

ECON 6999. Graduate Thesis Research. (1-6) Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit. *(On demand)*

ECON 7999. Masters Degree Graduate Residency. (1) (Fall, Spring, Summer)

GENERAL GRADUATE COURSES IN BUSINESS

Finance Courses

FINN 5158. Student Managed Investment Fund I. (3) Prerequisites: FINN 3120 or MBAD 6152, and FINN 3222 or FINN/MBAD 6153. Management of an actual portfolio consisting of a portion of the University's Endowment Fund. Admission is by permission of instructor. Students selected for the course are required to take FINN 5159. (Same as MBAD 5158.) *(Fall)*

FINN 5159. Student Managed Investment Fund II. (3) Prerequisites: FINN 3120 or MBAD 6152, and FINN 3222 or FINN/MBAD 6153. Management of an actual portfolio consisting of a portion of the University's Endowment Fund. Admission is by permission of instructor. Student cannot enroll in this course without successfully completing FINN 5158. (Same as MBAD 5159.) *(Spring)*

FINN 6058. Special Topics in Financial Services. (3) Prerequisite: MBAD 6152. Each year, the subject matter of this course deals with a different specialized and contemporary topic of interest to students who are preparing for management careers in the financial services industry. The topics are chosen and covered in a way that builds on and supplements the topics covered in other courses in the Financial Institutions/Commercial Banking concentration. Emphasis is placed on the managerial implications of the subject matter as well as the impact on the financial system. Topics covered in this course may vary from semester to semester, and the course may be repeated a maximum of one time for academic credit. Same as MBAD 6160.) *(On demand)*

FINN 6151. Financial Institutions and Markets. (3) Major financial institutions, particularly commercial banks, and their role in the intermediation process and as suppliers of funds to the money and capital markets. Comparative financial policies of these institutions are examined in the context of their legal and market environment. (Same as MBAD 6151) *(Yearly)*

FINN 6152. Financial Management. (3) Theory and practice of corporate finance including asset management, cost of capital and capital budgeting, optimization problems and socio-economic aspects of financial management. Computer technology may be employed when applicable. (Same as MBAD 6152) *(Fall, Spring)*

FINN 6153. Investment Management. (3) Prerequisite: MBAD 6152. Theory and practice of investment decisions of individuals and fund managers. Topics include the status of capital market theory, the efficient market hypothesis literature, and a portfolio performance measurement. Standard institutional and investment analysis topics, futures and options markets, and international investment topics are covered. (Same as MBAD 6153) *(Yearly)*

FINN 6154. Applied Business Finance. (3) Prerequisite: MBAD 6152. Examination of business finance topics which typically confront the firm's primary finance functional areas (CFO, Treasurer, Controller). The purpose is to develop advanced analytical skills in

those topic areas. The following topics form the basis of the course: lease vs buy (borrow); leveraged buy-outs: merger analysis (emphasis on valuation); international operations of American firms (capital budgeting and cost of capital); capital structure; risk management. Such additional topics as working capital management; risk management; and relevant current topics will be included as time permits. (Same as MBAD 6154) *(On demand)*

FINN 6155. Multinational Financial Management. (3) Prerequisites: MBAD 6111 and 6152. Financial management of the multinational firm including management of foreign exchange risk and political risk, and the control and evaluation of financial policies of multinational firms. (Same as MBAD 6155) *(Yearly)*

FINN 6156. Commercial Bank Management. (3) Prerequisite: MBAD 6152. Techniques for the management of commercial banks. Topics of study include industry structure, administrative organization, management of assets, liabilities, and capital, and financial analysis of the banking firm. (Same as MBAD 6156) *(Yearly)*

FINN 6157. Theory of Corporate Finance. (3) Prerequisite: MBAD 6152. Theories of modern corporate finance, including theory of efficient capital markets; uncertainty and the theory of choice; market equilibrium asset pricing models (capital asset pricing model, arbitrage pricing theory, Black-Scholes); theories of capital structure and the cost of capital; dividend policy; and leasing. (Same as MBAD 6157) *(Yearly)*

FINN 6203. Financial Economic Theory. (3) Prerequisites: Admission to Graduate Program and Permission of program director. Review of financial economic theory using discrete-time models. Topics include: risk measurement; choices under uncertainty; portfolio selection; capital asset pricing model (CAPM); Arrow-Debreu pricing; options and market completeness; the Martingale measure; arbitrage theory; consumption-based CAPM; and valuation of the firm. (Same as ECON 6203)

FINN 6210. Derivatives I: Financial Elements of Derivatives. (3) Prerequisite: FINN 6152 or equivalent, or permission of Department. Theory and practice of financial derivatives markets including forwards, futures, and options markets. Topics include the economics of derivatives markets, pricing models for instruments in these markets, strategies for hedging and speculation, as well as regulatory and governance issues.

FINN 6211. Risk Management and Fixed Income Derivatives. (3) Prerequisite: FINN 6210 or permission of Department. Risk management of fixed income portfolios as well as the theory and practice of fixed income markets. Topics include fixed income instruments, term structure models, pricing methods, portfolio management, duration and convexity, securitization, and hedging.

FINN 6219. Financial Econometrics. (3) Prerequisites: ECON 6218 or MATH 6201. Advanced time series with financial applications. Topics covered include time series regressions (univariate and multivariate, stationary and non-stationary) and time series models (including ARMA, ARCH, GARCH, stochastic volatility and factor models). The emphasis will be on model properties, estimators, test statistics, and applications in finance. (Same as ECON 6219.)

College of Education

At the University of North Carolina at Charlotte, graduate students in the College of Education have many different opportunities to expand their knowledge and skills in preparation for new educational roles and increased leadership responsibilities. While many professional education programs lead to advanced NC licensure, other programs lead to both initial and advanced licensure, and still others are not associated with licensure. The College of Education is accredited by the National Council for Accreditation of Teacher Education. All licensure programs are approved by the North Carolina Department of Public Instruction. Program graduates positively influence their peers, clients, and students; contribute to the development of effective schools and agencies for all children; and work to alleviate and prevent many of today's educational and social obstacles.

One of the college's most important functions is to serve as a regional resource in education, research, and service to help address the challenges of urban schools. The college has a strong partnership with the 14 school districts in the region and is located within the bounds of Charlotte-Mecklenburg Schools, a large urban district enrolling more than 116,000 students.

Programs are listed by degree and discipline below, then details are presented in alphabetical order by discipline. The Master of Arts in Teaching and the Fast Track Initial Licensure Program are described in a separate section.

Doctoral Programs

Doctor of Education (Ed.D.)
- Educational Leadership: *Specializations in (1) The Superintendency, (2) Curriculum and Supervision, or (3) Community Leadership*

Doctor of Philosophy (Ph.D.)
- Counseling
- Curriculum and Instruction: *Specializations in (1) Urban Education, (2) Literacy Education, (3) Mathematics Education*
- Special Education

Masters Degree Programs

Master of Arts (M.A.)
- Counseling: Agency
- Counseling: School *(Licensure program)*
- English Education *(Advanced licensure – Also see English Department)*
- Mathematics Education *(Advanced licensure – Also see Mathematics Department)*

Master of Arts in Teaching (M.A.T.) *(Combines initial and advanced licensure)*
- Elementary Education
- Fine and Performing Arts Education: Art, Dance, Music, or Theatre
- Foreign Language Education: French or German
- Middle Grades Education: English Language Arts, Mathematics, Science, or Social Studies
- Secondary Education: English, Mathematics, History/Comprehensive Social Studies, Comprehensive Science, Biology, Chemistry, Earth Sciences, or Physics
- Special Education: General Curriculum or Adapted Curriculum
- Teaching English as a Second Language

Master of Education (M.Ed.) *(Advanced licensure)*
- Child and Family Studies (B-K) *(Also offers combination of initial and advanced licensure)*
- Curriculum and Supervision
- Elementary Education
- Instructional Systems Technology *(Also offers a non-licensure track)*
- Middle/Secondary Education
  - Middle Grades track: English Language Arts, Mathematics, Science, or Social Studies
  - Secondary Education track: History/Comprehensive Social Studies, Comprehensive Science, Biology, Chemistry, Earth Sciences, or Physics
- Reading Education
- Special Education:
  - Academically Gifted
  - Adapted Curriculum
  - General Curriculum
- Teaching English as a Second Language

Master of School Administration (M.S.A.) *(Advanced licensure)*
- School Administration

Graduate Non-degree Programs

Fast Track Initial Licensure Programs
- Child and Family Development
- Elementary Education
- Fine and Performing Arts Education: Art, Dance, Music, or Theatre
- Foreign Language Education: French, German, or Spanish
- Middle Grades Education: English Language Arts, Mathematics, Science, or Social Studies
- Secondary Education: English, Mathematics, History/Comprehensive Social Studies, Comprehensive Science, Biology, Chemistry, Earth Sciences, or Physics

Special Education: General Curriculum or Adapted Curriculum
Teaching English as a Second Language

Graduate Certificate Programs
Child and Family Development: Early Intervention
Substance Abuse Counseling
Curriculum and Supervision
Academic or Intellectually Gifted
Supported Employment and Transition

CHILD AND FAMILY STUDIES: EARLY EDUCATION

Department of Special Education and Child Development

348 College of Education Building
704-687-8830
http://education.uncc.edu/spcd/

Degree

M.Ed., Graduate Certificate

Coordinator

Dr. Richard White (Interim)

Graduate Faculty

Kim Brooks, Lecturer
Deborah Ceglowski, Associate Professor
Deana Deason, Lecturer
Lyn Rhoden, Assistant Professor
Bobbie Rowland, Professor Emeritus
JaneDiane Smith, Assistant Professor
JoAnn Springs, Assistant Professor

MASTER OF EDUCATION IN CHILD AND FAMILY STUDIES: EARLY EDUCATION

The M.Ed. in Child and Family Studies: Early Education prepares professionals for leadership positions that serve young children with and without disabilities and their families. It is conveniently designed for prospective students already working full-time in professional settings who wish to pursue an advanced degree on a part-time basis and for those who wish to pursue a degree on a full-time basis. There are three different tracks within the M.Ed. program- 2 for candidates seeking both initial and advanced birth- kindergarten [B-K] licensure and one track for individuals with an initial B-K license seeking advanced licensure. The graduate degree program is for professionals who teach or provide services or interventions in infant, toddler, and preschool and kindergarten settings that include young children with and without disabilities; who administer preschool and family agency programs that have a child development and family relations focus; who work as consultants, parent educators, inclusion specialists, program coordinators, supervisors, and staff development trainers; or who seek research and evaluation expertise in child and family studies and community leadership in child and family programs. Graduates will qualify for the Master's Level "advanced competencies" Birth-Kindergarten (B-K) Teaching License issued by the North Carolina Department of Public Instruction upon completion of the program.

Program Objectives

The M.Ed. degree in Child and Family Studies: Early Education prepares each advanced master's degree student with skills to:

1) Integrate and apply empirical and theoretical knowledge of the growth and development of young children with and without disabilities.
2) Conduct research on individual and family development and behavior
3) Employ interdisciplinary approaches to the study of child development, the family, and other social institutions that include the influence of social context and policy variables on children and their families.
4) Take leadership roles in programs that support the development of infant, toddler, preschool, and kindergarten children with and without disabilities.
5) Demonstrate advanced knowledge and understanding of interrelationships of families, family dynamics, and children within these contexts.
6) Design and evaluate inclusive learning environments that promote the development of children of all developmental levels and abilities.

Degree Requirements

The M.Ed. in Child and Family Studies: Early Education requires a total of 39 semester hours of course work.

Track A: For candidates with a B-K license:

Core Courses (18 hours)

CHFD6102	Learning and Development (3)
CHFD6200	Curriculum and Learning Environments for Young Children (3)
CHFD6210	Inclusive Education for Young Children (3)
CHFD6220	Family Theory and Research (3)
CHFD6230	Emerging Literacy and Mathematical Understanding (3)
CHFD6000	Topics in Child and Family Development (3)

Applied Research/Evaluation (6 hours)

RSCH6101	Educational Research Methods (3)
CHFD6900	Research in Child and Family Studies (3)

Thematic Electives (9 hours)
To be selected from the categories of Education of Young Children; Family Studies; Early Intervention; Administration/Supervision; or individually planned option, with advisor approval.

Internship/Seminar (6 hours)
- CHFD6400 Internship in Child and Family Studies (3)
- CHFD6600 Seminar: Leadership in the Education of Children and Families (3)

Track B: Candidates with an elementary or special education teaching license but without a B-K license; or individuals with undergraduate degrees in child development:

Phase 1(18 hours):
- CHFD6102 Learning and Development (3)
- CHFD6200 Curriculum and Learning Environments for Young Children (3)
- CHFD6220 Family Theory and Research (3)
- CHFD6230 Emerging Literacy and Mathematical Understanding (3)
- SPED5111 Issues in Early Intervention (3)
- SPED5210 Methods in Early Intervention: B - K (3)

Phase 2 (21 hours)
- RSCH6101 Research Methods (3)
- SPED5112 Assessment of Young Children with Disabilities: B - K (3)
- CHFD6130 Concepts of Teaching and Learning: Child's Play (3)
- CHFD6240 Advanced Studies in Infant and Child Development (3)
- CHFD6210 Inclusive Education for Young Children (3)
- CHFD6600 Seminar: Leadership in the Education of Children and Families (3)
- CHFD6900 Research in Child and Family Studies (Master's Project/Thesis) (3)

Track C: Individuals with a provisional (lateral entry) or emergency teaching license and those without a teaching license:

Phase 1 (27 hours):
- CHFD6102 Learning and Development (3)
- CHFD6220 Family Theory and Research (3)
- CHFD6230 Emerging Literacy and Mathematical Understanding (3)
- SPED5111 Issues in Early Intervention (3)
- SPED5112 Assessment of Young Children with Disabilities: B-K (3)
- SPED5210 Methods in Early Intervention: B - K (3)
- CHFD6210 Inclusive Education for Young Children (3)
- CHFD6240 Advanced Studies in Infant and Child Development (3)
- CHFD6400 Internship: Child and Family Studies (3)

Phase 2 (12 hours)
- RSCH6101 Research Methods (3)
- CHFD6200 Curriculum and Learning Environments for Young Children (3)
- CHFD6600 Seminar: Leadership in the Education of Children and Families (3)
- CHFD6900 Research in Child and Family Studies (Master's Project/Thesis) (3)

Admission Requirements
1) An application in writing accompanied by the application fee;
2) Evidence of a bachelor's degree from an accredited college or university;
3) Official transcripts of all previous academic work showing evidence of an overall grade point average (GPA) of 2.75 or above and a junior/senior GPA of 3.0 or above;
4) Evidence of satisfactory scores on the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT);
5) A personal statement outlining why the applicant seeks admission to the program and describing professional experiences with young children and their families;
6) Three letters of recommendation from persons familiar with the applicant's personal or professional qualifications.

Admission to Candidacy Requirements
Upon successful completion of a minimum of 24 semester hours of graduate work and in no case later than four weeks prior to the beginning of the semester in which he/she expects to complete all requisites for the degree, a student should file for admission to candidacy on a form supplied by the Graduate School. This application is a check sheet approved by the student's advisor and graduate coordinator listing all course work to be offered for the degree (including transferred credit and courses in progress).

Assistantships
Each Department in the College of Education funds a limited number of graduate teaching assistantships. Information about these assistantships, including application materials is available in the department office.

Internships
The internship is an intensive, culminating experience in which students assume a professional role in a child and family development setting and demonstrate the ability to provide direct services, to apply research and theory in a field-based setting, and to assume leadership roles. A minimum of 200 clock hours is required.

Advising
Upon admission, each student is assigned a faculty advisor who helps the student develop his or her program of study and must approve that program of study. Each student must also assemble a graduate committee for consultation and evaluation. Members of the committee include the student's faculty advisor and at least two other faculty members who represent major areas of concentration in the student's program.

Licensure
Candidates enrolled in Track B or C will qualify for the initial level B-K Teaching License issued by the North Carolina Department of Public Instruction upon completion of the first part of their program. Graduates will qualify for the Master's Level "advanced competencies" Birth-Kindergarten (B-K) Teaching License issued by the North Carolina Department of Public Instruction upon completion of the program.

Comprehensive Exam
An oral exam may follow the student's master's project/thesis completion. The oral exam is designed to provide the student with feedback from the members of the student's graduate committee about the written project/thesis.

Committees
Students should consult with their academic program advisor in the selection of the committee. The following guidelines are intended to assist the student and his or her academic program advisor in constituting the master's committee.

1) Chair - selected for content knowledge of the subject area that is selected for the culminating experience. This person may be, but need not be, from your department. It is recommended, however, that this person hold a graduate faculty appointment in your department.
2) Second and third members - selected for knowledge and expertise in the subject area (can be external to your department).
3) Technical advisor - (Thesis and Research Projects only) - selected for technical support (e.g., specialized skills in program evaluation, technical writing, assessment, curriculum design, graphics, ethnography, and survey research methodology). This person may be, but need not be from your department.
4) Additional members - may be added if the committee chair agrees. These members may be from - departments of the College other than your department, and may be from other colleges in the University or from outside the University with the prior written permission of the Dean of the Graduate School. (This whole process should start at the beginning of the semester prior to graduation. However, the student may begin anytime after completing 18 hours.)

Master's Project/Thesis
The nature of the project/thesis is developed by the student in consultation with the major professor and presented to the Advisory Committee for approval. The project is usually something that is practical and will be useful to the student in the professional role that will be assumed upon the completion of the degree. The thesis takes a more research-oriented approach.

Research Opportunities/Experiences
Students have the option of completing either an applied master's project or a research project/thesis related to their specialty area.

Program Certification/Accreditation
The College of Education is accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction (NCDPI) to offer a master's degree program in Child and Family Studies: Early Education. Graduates will qualify for the Master's/Advanced Competencies "M" license and prepare them to pursue national certification through the National Board for Professional Teaching Standards (NBPTS).

GRADUATE CERTIFICATE IN CHILD AND FAMILY DEVELOPMENT: EARLY INTERVENTION

The Graduate Certificate in Child and Family Development: Early Intervention is a 12-hour program. The certificate provides students with some of the coursework on services for infants, toddlers, and preschoolers with disabilities or at-risk of developmental delays that is required in order to obtain a North Carolina initial teaching license Birth-Kindergarten (B-K). Course content addresses current issues, service models for young children with disabilities, appropriate assessment, effective early intervention, and building more inclusive environments for young children with disabilities.

Course Requirements

SPED5111	Issues in Early Intervention for Children with Disabilities (3)
SPED5112	Assessment of Young Children with Disabilities: B - K (3)
SPED5210	Methods in Early Intervention: B - K (3)
CHFD6210	Inclusive Education for Young Children (3)

Admissions Requirements
1) Students must have a bachelor's degree from a regionally accredited university.

2) Students must provide original transcripts that indicate a minimum overall GPA of at least 2.75 and a junior/senior GPA of at least 3.0.
3) Students are not required to take the GRE or MAT. However, student's wishing to apply Graduate Certificate coursework to the M.Ed. must take the GRE or MAT prior to being admitted to the Child and Family Development graduate program.
4) The twelve (12) hours taken toward a Graduate Certificate may be applied to the advanced master's degree program in Child and Family Development with the consent of the graduate program coordinator.
5) Admission to the Graduate Certificate program does not ensure admission to the master's degree program.

Courses in Child and Family Development

CHFD 5000. Topics in Child and Family Development. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

CHFD 6000. Topics in Child and Family Development. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

CHFD 6100. Adjustment Issues: Children in Family Context. (3) Study of adjustment problems of childhood and adolescence with emphasis on the context and patterns of the family-of-origin system that influence behavior and attitudes as children with and without disabilities grow and develop. *(On demand)*

CHFD 6102. Learning and Development. (3) In-depth study of selected theories of learning and development. *(Fall, Spring, Summer) (Evenings)*

CHFD 6110. Parenting Education. (3) Prerequisite or corequisite: CHFD 6102. An examination of the principles and practices of parenting education in terms of research, program implementation, evaluation, and collaboration. In-depth study of developmental designs, supportive programs designed to prevent problems, and programs and organizations which respond to parent needs and interests. Emphasis is placed on the process of parent involvement, communication, and collaborative leadership. *(On demand)*

CHFD 6115. Child and Family Advocacy. (3) Prerequisite: CHFD 6102. Study of the principles and practices of child and family advocacy. *(On demand)*

CHFD 6120. Creativity, Learning Environments and Experiences. (3) Investigation of theories of creativity and their relationship to curriculum development. *(On demand)*

CHFD 6130. Concepts of Teaching and Learning: Children's Play. (3) Examination of theories, trends and current practices in children's play. *(On demand)*

CHFD 6200. Curriculum and Learning Environments for Young Children. (3) Prerequisite or corequisite: CHFD 6102. Theoretical and research foundations for designing, implementing, adapting, and evaluating curriculum that is responsive to the needs of young children with and without disabilities. Observational strategies are used to assess both the child (individual, sociocultural, and developmental characteristics) and the environment in order to identify best practices. *(Spring)*

CHFD 6210. Inclusive Education for Young Children. (3) Prerequisite or corequisite: CHFD 6102. Inclusive education provides the opportunity for children with and without developmental disabilities to learn together. Inclusive early childhood curricula and instructional strategies are emphasized as is the professional role of interdisciplinary team member. Legislative mandates for inclusion are studied. *(Fall)*

CHFD 6220. Family Theory and Research. (3) Prerequisite or corequisite: CHFD 6102. Study of family theories and research which employ the contextual framework of the family as a system and which explain family of origin, family functioning, family structure, and family process. Application of theory and research will include an understanding of the various levels of family functioning as a model for developing family support and intervention plans. *(Fall)*

CHFD 6230. Emerging Literacy and Mathematical Understanding. (3) Prerequisite or corequisite: CHFD 6102. Emergent development of literacy and mathematical understanding in the home and preschool settings for young children with and without disabilities. Language and cognitive development theories and research are linked to home and classroom experiences that enhance literacy and mathematical understanding through developmentally appropriate practices. *(Spring)*

CHFD 6240. Advanced Studies in Infant and Child Development. (3) Prerequisite: CHFD 6102. An advanced course to extend knowledge of infant, toddler, and preschool development of children with and without disabilities. Developmental domains of infants and young children and their relationships within family and society will be emphasized. *(Fall)*

CHFD 6400. Internship in Child and Family Studies. (3) Prerequisite: completion of at least 24 hours of graduate program. Corequisite: CHFD 6600. An intensive, professional supervised internship in which students demonstrate the ability to provide direct service,

to apply research and theory in a field-based setting, and to assume leadership roles. A minimum of 200 clock hours is required. *(Spring)*

CHFD 6600. Seminar: Leadership in Education of Children and Families. (3) Prerequisite: completion of at least 24 hours of graduate program. Corequisite: CHFD 6400. A synthesizing course of study focusing on review, compilation, analysis, and evaluation of the literature, research, and experiences relevant to the student's specialty area. Students will demonstrate leadership by conducting a program evaluation, creating innovative solutions to challenges, and initiating and creating collaboration among persons and across agencies. *(Spring)*

CHFD 6800. Individual Study in Child and Family Studies. (1-6) Prerequisite: a written plan of study approved by the student's advisor and the individual study director. Designed to allow a student to pursue specialty interests under the supervision of an appropriate faculty member. Permission of the student's advisor and appropriate individual study director. May be repeated for credit. *(Fall, Spring, Summer)*

CHFD 6900. Research in Child and Family Studies (Master's Project/Thesis). (3) Prerequisites: RSCH 6101; completion of at least 24 hours of graduate program. Design, implementation, presentation, and evaluation of an approved applied research project in student's specialty area. The applied project is of the student's own design under the supervision of an advisor and graduate committee. Graded Pass/No Credit only. *(Fall)*

Advanced Graduate Only
CHFD 7135. Readings in Learning and Development. (3) Examines research data about the development of human behavior interpreted in terms of multiple disciplines, including psychology, anthropology and ethnology. *(On demand)*

COUNSELING

Department of Counseling
College of Education Building
704-687-8960
http://education.uncc.edu/counseling

Degrees
M.A., Ph.D., Certificates

Department Chair
Dr. Susan Furr

Coordinators
Dr. Phyllis Post – Doctoral coordinator
Dr. Henry L. Harris – Master's coordinator

Graduate Faculty
Dr. Lyndon Abrams, Assistant Professor
Dr. Bob Barret, Professor
Dr. Jack Culbreth, Assistant Professor
Dr. Susan Furr, Assistant Professor
Dr. Henry Harris, Associate Professor
Dr. Pam Lassiter, Assistant Professor
Dr. Kok-Mun Ng, Assistant Professor
Dr. Phyllis Post, Professor
Dr. Ed Wierzalis, Assistant Professor

MASTER OF ARTS IN COUNSELING

The M.A. program in Counseling is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) in both school counseling and community counseling. Both specializations qualify graduates to become Licensed Professional Counselors in North Carolina and for certification eligibility by the National Board of Certified Counselors. The school counseling specialization qualifies graduates for advanced-level K-12 school counseling licensure in North Carolina.

Program Objectives
As prospective professional counselors, graduates of the program are prepared to: counsel clients, both individually and in groups, on educational, career, life planning, social, emotional, physical, spiritual, and organizational concerns; provide information to clients for educational, social, career, and/or life planning; consult with other professionals concerning client needs; and conduct needs assessments, evaluations, and other activities for program design.

Additional Admission Requirements
In addition to the general requirements for admission to the Graduate School, the criteria for admission to the M.A. program in Counseling include an applicant's potential success in forming effective interpersonal relationships in individual and small-group contexts; aptitude for graduate-level study; vocational goals and objectives; openness to self-examination; and potential for personal and professional self-development. Admission decisions are based on applicants' individual profiles and made by a committee of program faculty. Applicants with the highest profile rankings are invited to campus for an interview process; the number invited is determined by the number of anticipated openings in the program. Students are admitted to the program in the spring of each year, and they are expected to begin their studies the following summer or fall. The application

deadline for each year's admissions process is November 15.

Prerequisite Requirements
Students are not required to have an undergraduate major in any particular field to enter the counseling program.

Degree Requirements
The M.A. program in Counseling requires a total of 60 hours of core courses for all students and specialization courses for students in either *school counseling* or *community counseling*. Both specializations include a series of required courses, clinical experience courses and elective courses.

Admission to Candidacy
In addition to meeting Graduate School academic regulations, counseling students should submit a completed Application for Admission to Candidacy when they submit their application for the program's capstone experience to the Department of Counseling, Special Education, and Child Development.

Core courses for All Students (33 credits):

CHFD6102 Learning and Development
Or
EDUC6100 Learning and Development
RSCH6101 Educational Research Methods
RSCH6109 Assessment and Evaluation Methods
CSLG6100 Counseling Theories
CSLG6101 Ethics in Counseling
CSLG6110 Counseling Techniques
CSLG6111 Advanced Techniques
CSLG6120 Group Counseling
CSLG6121 Structured Groups
CSLG6145 Multicultural Counseling
CSLG6150 Career and Lifestyle Development

School specializations courses (27 credits):

Required (9 credits):

CSLG7141 School Counseling
CSLG7646 Administration and Leadership of School Counseling Services
Elective from other Department in College (e.g., Special Education course)

Clinical experiences (two of three must be in a school setting) (9 credits):

CSLG7430 Practicum in Counseling (150 hrs)
CSLG7435 Internship (300 hrs)
CSLG7435 Advanced Internship (300 hrs)

Elective Courses (9 hours). These courses must be approved by the student's advisor.

Community Specialization courses (27 credits):

Required (6 credits):

CSLG7170 Community Counseling and Management
PSYC6153 Classification of Psychological Dysfunctions

Clinical experiences (two of three should be in a community setting) (12 credits):

CSLG7430 Practicum in Counseling (150 hrs)
CSLG7435 Internship (300 hrs)
CSLG7435 Advanced Internship (300 hrs)

Elective Courses (12 hours). These courses must be approved by the student's advisor.

Comprehensive Exam or Master's Project
Students must successfully complete either a written comprehensive examination or a master's project near the end of their program of study. Students are expected to consult with their advisors during the first 24 hours of course work concerning procedures and preparation for this experience.

Advising
All students should plan their program of study by December of their first year of study with their advisors.

Licensure
Students who graduate from the school counseling track are eligible, upon passing the exam required by the North Carolina Department of Public Instruction (DPI), to be recommended for school counseling licensure from the North Carolina DPI. All graduates are eligible to apply for the credential of Licensed Professional Counselor through the NCBLPC.

Program Certifications/Accreditation(s)
The school and community tracks are accredited by the Council for the Accreditation of Counseling and Related Education Programs (CACREP).

PH.D. IN COUNSELING

The Ph.D. in Counseling is designed to provide doctoral-level preparation for professionals who seek advanced clinical training and leadership positions in the counseling field. A unique feature of this program is its emphasis on increasing knowledge, awareness, and skills in interacting with socially and culturally diverse populations. Doctoral-level counselors may work as counselor supervisors, direct service providers, counselor educators, program consultants, researchers, program evaluators, and in other roles that require leadership in the areas of human services, family development, community organizations, and counseling. Potential employment settings include schools, hospitals, employee assistance programs, substance abuse treatment centers, community mental health agencies, and private practice centers, as well as institutions of higher education.

The Ph.D. in Counseling requires a minimum of 57 semester hours beyond those earned in an accredited master's program of at least 48 semester hours. Advanced preparation will be required in the following areas:

1) implications of ways in which diversity (e.g., race, gender, age, religion, spirituality, ethnicity, mental/physical ability, nationality, and sexual orientation) influence counseling practice and counselor education;
2) theories pertaining to the principles and practice of counseling, career development, group work, and consultation;
3) clinical skill development in counseling, group work, and consultation;
4) theories and practice of counselor supervision;
5) design and implementation of quantitative research and methodology (e.g., univariate, multivariate, single subject design);
6) design and implementation of qualitative research and methodology (e.g., grounded theory, ethnography, and phenomenological methodologies);
7) models and methods of assessment and use of data;
8) ethical and legal considerations in counselor education and supervision;
9) instructional theory and methods relevant to counselor education.

Program Objectives

The Program Objectives are:

1) To acquire, integrate, and apply empirical and theoretical knowledge of the field of counseling.
2) To develop leadership skills in counselor education, supervision, advanced counseling practice, and research.
3) To apply advanced skills and competencies in field-based settings.
4) To conduct research and generate new knowledge in counseling.
5) To design, adapt, and evaluate curricula in the field of counseling.
6) To develop depth and breadth in professional growth and continued life-long learning.
7) To examine the influence of social context and policy variables on human behavior.
8) To show increased sensitivity and clinical skills that demonstrate awareness of the diversity of race, gender, age, religion, ethnicity, mental/physical ability, nationality, and sexual orientation as relevant to counseling professionals.

In addition, doctoral students will participate in internship experiences of at least 600 clock hours that may include counselor education, supervision, advanced counseling practice, and research.

Students also collaborate with faculty as a part of their Professional Development plan in teaching, supervision, counseling services, research, professional writing, and service to the community, region, and profession.

Prerequisite Requirements

Applicants should possess a CACREP approved Master's Degree in counseling with a cumulative GPA of 3.5 (on a scale of 4.0) or higher. Students with master's degrees requiring less than 60 semester hours may need to complete prerequisite courses. Two years of experience as a professional counselor preferred.

Degree Requirements and Course Scheduling

Year 1: Fall

CSLG8100	Advanced Counseling Theories
CSLG8345	Advanced Multicultural Counseling
RSCH8110	Statistics 1
CSLG8000	Professional Orientation

Year 1:Spring

CSLG8431	Doctoral Practicum in Counseling
CSLG8346	Applied Multicultural Counseling
RSCH 8120	Statistics 2

Year 1: Summer

RSCH8210	Applied Research
CSLG8203	Instructional Theories

Year 2: Fall

CSLG8110	Clinical Supervision in Counseling
CSLG8998	Prospectus Design
RSCH8140	Multivariate Statistics

Year 2: Spring

CSLG8410	Practicum in Clinical Supervision
CSLG8440	Internship I
Elective	

Year 2: Summer

CSLG8999	Dissertation

Year 3: Fall

CSLG8440/8445	Internship
CSLG8999	Dissertation
Elective	

Year 3: Spring

CSLG8999	Dissertation
(CSLG8445	Internship II)

Admission to Candidacy Requirements

Students are considered candidates for the doctoral degree on successful completion of the Comprehensive Examination and acceptance of the Dissertation Proposal.

Assistantships

Graduate Assistantships are available in various offices on campus. Applications must be submitted to individual departments/offices.

Internships

Doctoral students are required to complete a total of 600 clock hours (spread over two semesters) of internship (CSLG 8440). One internship will be devoted to developing clinical skills; the other may be either further clinical development or, for those interested in counselor education as a career, may be directed towards teaching with the Counseling Faculty.

Practica

A Doctoral Practicum is taken in the first year of study. The practicum requires 150 hours over the course of a semester at an approved site in the community. The Practicum will involve the acquisition of new skills and learnings regardless of the site selected.

Electives

There are two elective courses in the curriculum. These are most commonly taken within the Counseling curriculum but may be taken in other departments as long as the courses are designated at the 8000 level.

Advising

Each student is assigned a faculty advisor when admitted to the program. The advisor assists student during the initial stages of the program. By the end of the student's first semester the advisor will have assisted the student in developing a Program of Study. The Program of Study must be approved by and filed with the Doctoral Program Coordinator. Advisors will also assist students in identifying faculty whose research interests and expertise are congruent with the student's probable area of inquiry for the dissertation. The assistance of the advisor does not relieve the student of responsibility for completing required work and following departmental and university procedures. As students approach candidacy and a concentration area for the dissertation is identified the student may request a change of advisors, and the new advisor will become the Dissertation Committee Chair.

Comprehensive Exam

The main objective of the written portion of the qualifying exam is to ensure that the student is adequately prepared to write a dissertation to complete the Ph.D. degree requirements. Being prepared means the following:

1) examinees must be able to analyze and synthesize information obtained from coursework and research within a multicultural counseling context;
2) examinees must demonstrate advanced knowledge in the core areas of supervision and counseling theory;
3) examinees must demonstrate competencies in research methodology and evaluation.

The exam will be a 4.5 day take-home exam and will be administered in the fall and spring semesters.

Dissertation Committee

A Dissertation Committee comprised of at least five faculty members will be formally appointed for each student after admission to candidacy. At least three committee members must be on the Counseling Program faculty and one member will be appointed by the Graduate School. A person outside the university may serve as a full member of the Dissertation Committee in situations where knowledge or expertise of a particular nature is desired. With the mutual consent of the student and the faculty member, a faculty member who is recommended by the Doctoral Program Coordinator and appointed by the Department Chair will be designated to serve as the Chair of the Doctoral Committee. The Chair of the Doctoral Committee will provide program advisement through the Comprehensive Exam process, the internship experiences, the remainder of the student's program of study, and is, at all times following appointment, the advisor and coordinator of the student's doctoral study. Chairs of Doctoral Committees are specifically responsible for seeing that the student progresses in an expeditious manner towards completion of the degree. Chairs will assist students in organizing committee meetings, conducting original research, presenting the proposal, and organizing the dissertation defense. Eligible Faculty are all tenured faculty (Professor/Associate Professor). Assistant professors who have been reappointed for their second term may chair dissertation committees as follows. In their initial role as dissertation chairs, Assistant Professors will chair two committees with the assistance of a tenured faculty mentor. During the mentoring process the two faculty members will develop a clear understanding of the roles and responsibilities of each, and the student will be fully informed of this agreement. After serving as chair on two successfully completed dissertations, assistant professors may serve as chair without mentoring. Each appointed Committee Member will have both voice and vote on all relevant matters pertaining to a doctoral student's progress towards the degree. At least four committee members must be present for the oral defense of the dissertation. The oral defense is considered satisfactory upon the positive vote of at least four committee members. Prior to and following the appointment of this committee students are encouraged to work with faculty on dissertation ideas.

Dissertation

Each candidate for the doctoral degree is required to prepare and present a dissertation that shows independent investigation and is acceptable in form and content to the Dissertation Committee. A doctoral dissertation must demonstrate the candidate's ability to conceive, design, conduct, and interpret independent, original, and creative research and must make a unique contribution to knowledge in the field of counseling. Under the direct supervision of the Doctoral Committee Chair, students are encouraged to consult regularly with their Dissertation Committee members during the planning, conducting and writing of the dissertation. Following the approval of the dissertation proposal students are required to maintain continuous enrollment (fall and spring semesters) for dissertation study until

work is completed. Continuous enrollment begins on the date the Graduate School approves the student's dissertation topic. Students who exceed the required number of hours for degree completion will register for CSLG 8999 for three credits each semester until degree requirements have been completed.

Financial Aid/Financial Assistance

There is limited financial aid available in the form of grants and tuition waivers. The exact amount of funds available for any given year varies.

Program Certifications/Accreditation(s)

The program has been accredited by the Council for the Accreditation of Counseling and Related Education Programs (CACREP).

CERTIFICATE IN SUBSTANCE ABUSE COUNSELING

A curriculum has been established for a specialty in substance abuse counseling. The four courses CSLG 6160/8160: Theories of Chemical Dependence; CSLG 6161/8161: Chemical Dependence: Assessment and Diagnosis; CSLG 6162/8162: Chemical Dependence: Counseling Individuals, Families, and Groups; CSLG 6163/8163: and Chemical Dependence: Treatment Planning and Relapse Prevention compose a specialty in substance abuse counseling. These four courses plus 600 hours of supervised field experiences in substance abuse treatment facilities are components of a university-approved certificate program. Students who successfully complete the four courses along with the 600 hours of field experience, and hold a master's degree in counseling or related field are exempt from the written portion of the exam required for certification by the North Carolina Substance Abuse Professional Certification Board. Applications for admission to the Certificate Program will be considered as they are received and admissions will be ongoing. Students are admitted to the Graduate School in a special category for certificate students.

Additional Admission Requirements

In addition to the general requirements for admission to a certificate program, applicants must provide official transcripts, three letters of recommendation from persons familiar with the applicant's personal and professional qualifications, and an essay describing the applicant's relevant experience and objectives in undertaking the certificate program in substance abuse counseling.

Financial Assistance

Financial assistance is available on a limited basis for students enrolled in the Substance Abuse Certificate Program. Contact the Department of Counseling for information on scholarship application.

POST-MASTERS CERTIFICATE IN SCHOOL COUNSELING

The post-masters certificate in school counseling consists of a coherent program in school counseling. Successful completion of the program requirements will enable the counselor to be recommended for licensure in school counseling from the North Carolina Department of Public Instruction. A minimum of twelve credit hours is required for the post-masters graduate certificate. All course work applied to a certificate must be completed within four years. Transfer credit is not normally accepted into the certificate program.

Program Description

This program has been designed for counselors who want to become eligible for licensure as school counselors by the Department of Public Instruction in North Carolina. The completion of this program, in addition to passing the PRAXIS II Specialty Area Test for School Counselors, will qualify students to become licensed School Counselors. Requirements for completion of the program are CSLG 7141.The School Counselor (Fall), CLSG 7646. Administration and Leadership of School Counseling Services (Spring), CSLG 7435. Internship (School-based Clinical) (Fall/Spring), a School-based Elective (Fall, Spring, Summer) and any additional course work based on an individual review of each applicant's graduate transcript(s) and selected program option.

Additional Admission Requirements

1) A master's degree in counseling from an accredited university.
2) Written application to Graduate Admissions accompanied by the application fee in effect.
3) GPA required for entry into a master's degree program.
4) Official transcripts

Program Options

OPTION A: For counselors who graduated from a 60 credit CACREP accredited program.
Program Requirements:
Based on a review of the applicant's transcript, a program of study will be designed that indicates the counselor has completed the following courses:

CSLG7141	The School Counselor (3 credits)
CSLG7646	Administration and Leadership of School Counseling Services (3 credits)
CSLG7435	School-based Internship (3 credits)

An additional school-based elective (3 credits)

OPTION B: For counselors who graduated from CACREP accredited programs with less then 60 credits.
Program Requirements:
Based on a review of applicant's transcript, a program of study will be designed that is equivalent to a 60 credit

school counseling program, including the following courses:

CSLG7141 The School Counselor (3 credits)
CSLG7646 Administration and Leadership of School Counseling Services (3 credits)
CSLG7435 School-based Internship (3 credits)
An additional school-based elective (3 credits)

OPTION C: For counselors who graduated from non-CACREP accredited programs.
Program Requirements:
Based on a review of applicant's transcript, a program of study will be designed that is equivalent to a 48 credit school counseling program, including the following courses:

CSLG7141 The School Counselor (3 credits)
CSLG7646 Administration and Leadership of School Counseling Services (3 credits)
CSLG7435 School-based Internship (3 credits)
An additional school-based elective (3 credits)

Additional Program Requirements

In addition to completing required courses, students must pass the PRAXIS II Specialty Area Test for School Counseling to qualify for state licensure.

Courses in Counseling

CSLG 6000. Topics in Counseling. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

CSLG 6100. Counseling Theories. (3) Examination of the counseling relationship from various theoretical frameworks, including client-centered, psychoanalytic, Gestalt, transactional analysis, rational emotive, reality, and behavior theories. *(Fall, Summer)*

CSLG 6101. Ethical and Professional Issues In Counseling. (3) Ethical and legal responsibilities, ethical standards, interpretations of laws by local authorities, and court decisions that impact the counseling profession. Skills of practical, ethical, and legal consultation are also emphasized. *(Fall, Summer)*

CSLG 6109. Research in Counseling. (3) Examination of principles and practices for research and development of programs in counseling with emphasis on developmental designs, preventive programs, objectives and organizations. *(On demand)*

CSLG 6110. Counseling Techniques. (3) Examination of concepts of individual counseling and the means for establishing facilitative relationships including competence in basic counseling skills and interventions. *(Fall, Spring)*

CSLG 6111. Advanced Counseling Techniques. (3) Prerequisites: CSLG 6100 and 6110. Counseling interventions useful in facilitating client change and growth from an action-oriented, problem management perspective. Strategies for cognitive, affective, and behavioral change will be practiced. *(Fall, Spring, Summer)*

CSLG 6115. Person-to-Person Relationships. (3) Examination of concepts and methods for improving human relationships. This course has an experiential component. *(On demand)*

CSLG 6120. Group Counseling. (3) Investigation of concepts of group counseling and the means for developing facilitative interaction in groups which will include an experiential component as a major learning activity. *(Fall, Spring)*

CSLG 6121. The Leadership and Design of Structured Groups. (3) Methods of creating psychoeducational groups. Focus on applying psychological theories to the selection of group content. Leadership issues such as screening, dealing with difficult members, and leader roles are addressed. *(Fall, Spring)*

CSLG 6145. Multicultural Counseling. (3) Approaches to counseling that focus on multicultural differences so the counselor will be more effective in dealing with clients from a variety of cultural backgrounds. *(Spring, Summer)*

CSLG 6150. Career and Lifestyle Development. (3) A counseling-oriented course designed to help the counselor and/or career education teacher develop the ability to use career information with emphasis on understanding of occupational information, systems of collection and usage forms. *(Spring, Summer)*

CSLG 6152. Approaches to Career Development (K-12). (3) Counselors and vocational development coordinators gain an understanding and skills necessary for (1) the development, management and evaluation of a comprehensive, competency-based K-12 career education/ counseling program, (2) infusing career education into K-12 curriculum in a counselor/consultant capacity, and (3) establishing and leading successful individual and group career development activities. *(On demand)*

CSLG 6160. Theories of Chemical Dependence. (3). Introduction to the theoretical, philosophical, and historical premises upon which chemical dependence is explained and treatment and prevention are based. Biological, psychological, and sociological etiologies of substance abuse and dependence are studied. *(Alternate Fall, Even years)*

CSLG 6161. Assessment and Diagnosis of Chemical Dependency. (3) Process and procedures for professional biopsychosocial assessment and diagnosis of substance abuse and dependence in adolescents and

adults are studied. Implications of chemical dependence for clients and their families are addressed. *(Alternate Spring, Odd years)*

CSLG 6162. Chemical Dependency: Counseling Individuals, Families, and Groups. (3) A counseling techniques course designed to help students who have worked as professional substance abuse counselors and those who have little or no experience working with substance dependent individuals and their families. *(Alternate Fall, Odd years)*

CSLG 6163. Chemical Dependency: Treatment Planning and Relapse Prevention. (3) An introduction to the principles and practices upon which chemical dependence treatment and relapse prevention are based. Computerized programs will be used to aid students in assessment, diagnosis, and in planning treatment for chemically dependent clients *(Alternate Spring, Even years)*

CSLG 6200. Introduction to Theories of Family Counseling. (3) Examination of appropriate interventions in working with families focusing on major theorists and techniques in the field. *(Spring)*

CSLG 6201. Counseling Needs of Women. (3) Women's development and needs, the problems they bring to counselors, strategies for helping with them, myths about women and biases in psychological research. *(On demand)*

CSLG 6800. Individual Study in Counseling. (1-6) Prerequisite: Permission of the student's adviser. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

CSLG 7110. Individual Assessment. (3) Prerequisite: RSCH 6109 or PSYC 4140. Examination of the major aptitude, intelligence and other psychological tests commonly used in counseling with emphasis on test theory as well as the administration, scoring and interpretation of tests and the communication of their results. *(On demand)*

CSLG 7120. Administration and Supervision of Counseling Services. (3) Planning, operation, implementation and supervision of counseling and guidance services in schools and agencies with emphasis on the development of administrative and supervisory skills. *(On demand)*

CSLG 7140. Elementary School Counseling and Guidance. (3) Introduction to the guidance function in the elementary school with emphasis on the counselor's role in counseling, consulting and coordinating school and community resources for the optimum benefit of the child. (On demand)

CSLG 7141. The School Counselor. (3) Development of functional skills necessary for integration of counseling activities into the school curriculum. Focus on the role of the counselor in counseling individuals, small group counseling, classroom guidance, consultation, program design, coordinating school and community resources, and administration of special programs. *(Fall)*

CSLG 7142. Introduction to Play Therapy. (3) Examination of concepts of play therapy and the means for establishing facilitative relationship with children under the age of ten years. *(Summer)*

CSLG 7143. Advanced Play Therapy: Extending the Skills. (3) Prerequisite: CSLG 7142. Focuses on advanced play therapy skills and introduces concepts and skills for training parents/teachers to be therapeutic agents in their children's lives through the utilization of play therapy skills. *(Alternate Fall, Even years)*

CSLG 7151. Approaches to Adult Career Development. (3) Prerequisite: CSLG 6150. For the career development specialist who needs to survey an environment in which adults are seeking career counseling; assess needs; develop interventions strategies to meet needs; and assess outcomes. *(On demand)*

CSLG 7153. Research Techniques and Computer Applications in Career Counseling. (3) Prerequisites: RSCH 6101, 6109 and 6110. Skills in preparing a literature review upon which to base a research study; critiquing theoretical, philosophical, and research material and reports; and conducting and reporting a research study. Focus on understanding the effective application of computer technology to the provision of career-related services in mental health, education, rehabilitative or other human services settings. *(On demand)*

CSLG 7160. Solution-Focused Brief Therapy. (3) Prerequisites: CSLG 6110; CSLG 6100; CSLG 7430. An introduction to counseling in a time-limited manner while helping clients understand how they maintain their problems and how to construct solutions.*(Summer)*

CSLG 7170. Community Counseling and Management. (3) Counseling in community agency settings, including the roles and functions of a professional counselor, assessing the needs of an agency population and the interworkings of various agencies and agency networks. *(Fall)*

CSLG 7190. Introduction to Pastoral Counseling. (3) Prerequisites: CSLG 6100, 6110. Introduction to the field of pastoral counseling including both theological and counseling dimensions. *(On demand)*

CSLG 7191. Advanced Issues in Pastoral Counseling. (3) Prerequisite: CSLG 7190. Specific content relevant to pastoral counseling including didactic and experiential foci. *(On demand)*

CSLG 7205. Techniques of Family Counseling. (3) Prerequisites: CSLG 6100, 6200. An overview of techniques used by family counselors working from communications, structural or strategic orientations. *(On demand)*

CSLG 7430. Practicum in Counseling and Guidance. (3) Prerequisites: CSLG 6100, 6101, 6110, and 7142 if working in an elementary school setting . Supervision of individual and group counseling interventions conducted in field settings; special attention to the development of evaluative criteria for self and peer assessment. A minimum of 10 hours per week in field placement. Offered on a pass/no credit basis. May be repeated once for credit with departmental approval. *(Fall, Spring)*

CSLG 7435. Internship in Counseling. (3) Prerequisite: CSLG 7430 and 7142 if working in an elementary school setting. Students will participate in delivering counseling services in a field setting and receive supervision of their work in weekly seminars. A minimum of 20 hours per week in field placement. Offered on a pass/no credit basis. *(Fall, Spring)*

CSLG 7436. Advanced Internship. (3) Prerequisite: CSLG 7435. Continuation of CSLG 7435. Students will function as counselors in field settings and have the opportunity to demonstrate advanced level skills in weekly seminars. A minimum of 20 hours per week in field placement. *(Fall, Spring)*

CSLG 7600. Sexual Orientation Diversity in Clinical Practice. (3) The course considers the experience of being gay, lesbian, bisexual or transgendered in our society. Theoretical understandings of sexual orientation are covered, as well as the impact of societal prejudice on gay, lesbian, bisexual and transgendered individuals and their communities. The experience of diversity with such communities is discussed, especially racial/ethnic diversity. Exploration of individual values combines with an emphasis on clinical practice to make this course relevant both personally and professionally. *(Spring)*

CSLG 7601. Counseling: The Spiritual Dimension. (3) This course is designed to assist counselors in understanding and facilitating the development of their personal spirituality as well as the spirituality of others with whom they provide counseling services. Spirituality is viewed as an important component to achieving mental health and to a balanced sense of wellness. Basic beliefs and various spiritual systems including major world religions will be examined *(Spring)*

CSLG 7644. Theory and Practice of Play Therapy. (3) An advanced exploration of fundamental issues involved in play therapy, this seminar course will focus on an in-depth study of various theoretical approaches underlying the practice of play therapy. Historical and theoretical foundations of play therapy are presented as are current issues in providing appropriate counseling services to children aged two to ten years old. *(On Demand)*

CSLG 7645. Cognitive-Behavior Theory and Practice. (3) An introduction to the theory and practice of cognitive-behavior therapy that can be applied in the school setting. The major theories (cognitive therapy, cognitive behavior modification, REBT, and reality therapy) will be examined, and treatment planning and application of techniques will be studied.*(Summer)*

CSLG 7646. Administration and Leadership of School Counseling Services. (3) This course will focus on the organization, planning, management, and evaluation of school counseling programs. Current issues impacting school counselors will be explored and intervention strategies will be examined. *(Spring)*

CSLG 7680. Crisis Counseling. (3) This course will focus on a general crisis intervention model and its application to specific crisis situations. Topics include: suicide intervention, rape crisis, telephone counseling, and disaster intervention.*(Summer)*

CSLG 7681. Grief and Loss Counseling. (3) This course examines the theory of loss, the tasks involved in grieving, and the skills needed by a counselor working with grief and loss issues. Loss will be examined from a broad perspective and includes issues associated with death, loss of relationships, and loss of abilities. *(Fall)*

CSLG 7800. Individual Study in Counseling. (1-6) Prerequisite of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

CSLG 7999. Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment during completion of capstone project or comprehensive examination. *(Fall, Spring, Summer)*

CSLG 8000. Topics in Counseling. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

CSLG 8100. Advanced Counseling Theory Seminar. (3) The principles and practices of traditional and more current counseling theories are studied. Students will examine the rationale and consequences of their pre-conceived notions about conditions that influence human behavior and change. Students will develop their own theory of counseling. *(Fall)*

CSLG 8105. Seminar in Research in Counseling. (3) This course focuses on exploring the outcome research in counseling and career development, as well as the variables that influence the counseling process. Special focus will be on developing areas of personal expertise,

developing research theses, and writing critical literature reviews.*(On Demand)*

CSLG 8110. Clinical Supervision in Counseling. (3) This course provides a critical overview of the conceptual and empirical literature on counseling supervision, including models, approaches/techniques, relationship and process issues, and ethical and legal considerations. Students will develop conceptual knowledge, skills, and self-awareness concerning these topic areas through readings, seminar discussions, and application via supervising master's level students. *(Fall)*

CSLG 8111. Solution-Focused Brief Therapy. (3) Prerequisites: CSLG 6110; CSLG 6100; CSLG 7430. An introduction to counseling in a time-limited manner while helping clients understand how they maintain their problems and how to construct solutions. *(Summer)*

CSLG 8142. Introduction to Play Therapy. (3) Prerequisite: None. Corequisite: None. Examination of concepts of play therapy and the means for establishing facilitative relationship with children under the age of ten years. *(Summer)*

CSLG 8143. Advanced Play Therapy: Extending the Skills. (3) Prerequisite: CSLG 7142. Corequisite: None. Introduces concepts and skills for training parents to be therapeutic agents in their children's lives through the utilization of play therapy skills. *(Alternate Fall, Even years)*

CSLG 8160. Theories of Chemical Dependence. (3). Introduction to the theoretical, philosophical, and historical premises upon which chemical dependence is explained and treatment and prevention are based. Biological, psychological, and sociological etiologies of substance abuse and dependence are studied. *(Alternate Fall, Even years)*

CSLG 8161. Assessment and Diagnosis of Chemical Dependency. (3) Process and procedures for professional biopsychosocial assessment and diagnosis of substance abuse and dependence in adolescents and adults are studied. Implications of chemical dependence for clients and their families are addressed. *(Alternate Spring, Odd years)*

CSLG 8162. Chemical Dependency: Counseling Individuals, Families, and Groups. (3) A counseling techniques course designed to help students who have worked as professional substance abuse counselors and those who have little or no experience working with substance dependent individuals and their families. *(Alternate Fall, Odd years)*

CSLG 8163. Chemical Dependency: Treatment Planning and Relapse Prevention. (3) An introduction to the principles and practices upon which chemical dependence treatment and relapse prevention are based. Computerized programs will be used to aid students in assessment, diagnosis, and in planning treatment for chemically dependent clients (3) *(Alternate Spring, Even years)*

CSLG 8200. Introduction to Theories of Family Counseling. (3) Examination of appropriate interventions in working with families focusing on major theorists and techniques in the field. *(Spring)*

CSLG 8201. Counseling Needs of Women. (3) Women's development and needs, the problems they bring to counselors, strategies for helping with them, myths about women and biases in psychological research. *(On demand)*

CSLG 8203. Instructional Theory in Counselor Education. (3) This course will prepare the student to become a professor in counselor education. An examination of the theories and methods of teaching in higher education will be explored. Readings from professional journals, lecture, discussion, and practical application in the classroom will be used to meet course objectives.*(Summer)*

CSLG 8345. Advanced Multicultural Counseling. (3) An advanced exploration of fundamental issues involved in culturally competent counseling, this seminar course will focus on an in-depth study of various cultures seeking counseling services. Students will examine various oppression models and have an opportunity to apply them to cultures in our community.*(Spring)*

CSLG 8346. Applied Multicultural Counseling . (3) This course focuses on the impact of oppression on the daily lives of marginalized groups. Students conduct extensive field-based investigations into various cultures in order to gain mastery-level knowledge of the practical day-to-day experiences especially as they involve accessing mental health services. Special focus will be on counseling applications that are appropriate within and between cultures. Learning to utilize systems interventions and the mastering the skills of consultation are key components of this course. *(Fall)*

CSLG 8410. Practicum in Clinical Supervision. (3) This course will provide students with the practical experiences necessary to provide individual supervision of counselors, including field supervision and analyses of counseling audio and videotapes. Students will have the opportunity to test their conceptual knowledge, skill, and self-awareness developed through prerequisite coursework. Offered on a pass/no credit basis. *(Spring)*

CSLG 8431. Doctoral Practicum in Counseling. (3) Practicum is an applied course where students will develop and/or refine their counseling skills. These skills will be conceptually linked counselor education and supervision. Working in sites throughout the community, students will produce audio and/or video tapes of

individual and group counseling practice for supervision. Offered on a pass/no credit basis. *(Spring)*

CSLG 8440. Internship I. (3) Student will deliver counseling services in a field setting and receive individual and group supervision of their work weekly. A minimum of 300 clock hours is required. Offered on a pass/no credit basis. *(Fall, Spring)*

CSLG 8445. Internship II. (3) Students will participate in 300 hours internship experience in field settings that are appropriate to their career objectives under the supervision of a University program faculty member. Offered on a pass/no credit basis. *(Fall, Spring)*

CSLG 8600. Sexual Orientation Diversity in Clinical Practice. (3) The course considers the experience of being gay, lesbian, bisexual or transgendered in our society. Theoretical understandings of sexual orientation are covered, as well as the impact of societal prejudice on gay, lesbian, bisexual and transgendered individuals and their communities. The experience of diversity with such communities is discussed, especially racial/ethnic diversity. Exploration of individual values combines with an emphasis on clinical practice to make this course relevant both personally and professionally. *(On Demand)*

CSLG 8601. Counseling: The Spiritual Dimension. (3) This course is designed to assist counselors in understanding and facilitating the development of their personal spirituality as well as the spirituality of others with whom they provide counseling services. Spirituality is viewed as an important component to achieving mental health and to a balanced sense of wellness. Basic beliefs and various spiritual systems including major world religions will be examined. *(On Demand)*

CSLG 8604. Counseling Sexual Minority Families and Couples. (3) This course will focus on the unique challenges facing the counselor who is providing clinical services to gay, lesbian, bisexual and transgendered families and couples. Topics include the impact of oppression on primary relationships, the political implications of sexual minority relationships, relationship models, parenting, and interacting with the outside world. *(On Demand)*

CSLG 8644. Theory and Practice of Play Therapy. (3) An advanced exploration of fundamental issues involved in play therapy, this seminar course will focus on an in-depth study of various theoretical approaches underlying the practice of play therapy. Historical and theoretical foundations of play therapy are presented as are current issues in providing appropriate counseling services to children aged two to ten years old. *(On Demand)*

CSLG 8645. Cognitive-Behavior Theory and Practice. (3) An introduction to the theory and practice of cognitive-behavior therapy that can be applied in the school setting. The major theories (cognitive therapy, cognitive behavior modification, REBT, and reality therapy) will be examined, and treatment planning and application of techniques will be studied. *(Summer)*

CSLG 8646. Administration and Leadership of School Counseling Services. (3) This course will focus on the organization, planning, management, and evaluation of school counseling programs. Current issues impacting school counselors will be explored and intervention strategies will be examined. *(Spring)*

CSLG 8680. Crisis Counseling. (3) This course will focus on a general crisis intervention model and its application to specific crisis situations. Topics include: suicide intervention, rape crisis, telephone counseling, and disaster intervention. *(Summer)*

CSLG 8681. Grief and Loss Counseling. (3) This course examines the theory of loss, the tasks involved in grieving, and the skills needed by a counselor working with grief and loss issues. Loss will be examined from a broad perspective and includes issues associated with death, loss of relationships, and loss of abilities. *(Fall)*

CSLG 8800. Individual Study in Counseling. (1-6) Prerequisite of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. Offered on a pass/no credit basis. *(Fall, Spring, Summer)*

CSLG 8998. Seminar in Prospectus Design. (3) This course will provide students the opportunity to identify and define a research area of inquiry and develop a proposal draft for the dissertation study. Students will be expected to select, plan and outline an original research study appropriate for the dissertation requirement. *(Fall)*

CSLG 8999. Dissertation. (9) Under the direction of a dissertation advisor and committee, the student is expected to design and execute an original research study. This study should address a significant issue or problem related to counseling or counselor education. Offered on a pass/no credit basis. *(Fall, Spring, Summer)*

CSLG 9999. Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment. *(Fall, Spring, Summer)*

CURRICULUM AND INSTRUCTION

Department of Middle, Secondary & K-12 Education

College of Education Building 317
704-687-8887
http://education.uncc.edu/phdci

Degree

Ph.D.

Coordinator

Dr. David K. Pugalee

PH.D. IN CURRICULUM AND INSTRUCTION

The Ph.D. in Curriculum and Instruction is designed to prepare teacher education faculty and other educational professionals in various agency and educational settings. The program is interdisciplinary involving faculty from the Departments of English; Mathematics; Middle, Secondary, & K-12 Education; and Reading and Elementary Education. The program focuses on issues and perspectives related to curriculum and instruction with specializations in literacy education (oriented toward reading or English education), mathematics education, and urban education. Studies include a substantive core in urban education and educational research. Students may focus their study on education for learners at elementary, middle grades, secondary, K-12, or post-secondary/adult levels.

Curriculum Objectives

1) Lead inquiry into the nature of curriculum theory and the relationship that theory has upon the major sources, components, and processes required in curriculum development, particularly within expanding urban-regional environments.
2) Demonstrate relationships among curriculum theory and design, models of and research about teaching and learning, variations among learners, and the ideological, social, and disciplinary contexts of teaching and learning, including the influence on urban-regional schools of state and national policies, curriculum philosophy, and political pressures.
3) Guide curriculum development and evaluation in its pragmatic context by applying curriculum theory, policy, and practice for diverse learners within a variety of educational settings.

Research and Evaluation Objectives

4) Use appropriate quantitative and qualitative research methods to solve problems in urban education and related disciplines, detect new patterns, and assess the effectiveness of instructional programs and teaching methodologies for all learners.
5) Communicate research and evaluation findings in a variety of written and electronic formats, such as evaluation reports, professional articles, grant proposals, conference presentations, and technical reports with the consistent underlying purpose of supporting educational effectiveness and reform in urban-regional environments.

Specialty Objectives

6) Apply theory and research in one's area of specialization to detecting new patterns, identifying problems, and solving urban-regional problems of curriculum, teaching, learning, and assessment through collaborative problem identification, research projects, policy formation, and staff development.
7) Exhibit sustained intellectual curiosity, broad understandings, specialized knowledge, and professional commitments pertaining to one's selected area of specialization within the context of urban-regional schools.

Additional Admission Requirements

Students should submit a current vitae and a professional writing sample. An interdisciplinary review committee will perform an initial review of application materials and recommend applicants for an on-campus interview. The interdisciplinary Curriculum and Instruction Committee will then make final recommendations to the Graduate School relative to acceptance into the program based on the merits of the application materials and the interview process which includes an on-campus writing exercise requiring the applicant to read a selected passage and react to a prompt.

Prerequisite Requirements

The intended audience for the Ph.D. in Curriculum and Instruction is comprised of education professionals who hold the master's degree. It is anticipated that most applicants will be experienced teachers or school leaders with the North Carolina "G" or "M" license or equivalent licenses from other states. However, the program will welcome and accommodate non-licensed candidates with appropriate professional experiences who have been involved in teaching or educational program development and evaluation.

Degree Requirements

The Ph.D. in Curriculum and Instruction requires a total of 60 semester hours of coursework, including the dissertation. A student must maintain a cumulative average of 3.0 in all coursework taken. An accumulation of more than two C grades will result in termination of the student's enrollment in the graduate program. If a student makes a grade of U in any course, enrollment in the program will be terminated. The program will consider the transfer of limited number of courses from a regionally accredited institution (typically no more than

six hours), providing the Curriculum and Instruction Committee determines that the course or courses to be transferred are appropriate for the program of study and are graduate-level courses beyond the master's degree. The grade in these transfer courses must be an A or B. All dissertation work must be completed at UNC Charlotte. Students must successfully complete requirements for the qualifying examination and dissertation. All students must complete a residency requirement of at least 18 credit hours over three successive terms of enrollment. Students must complete their degree, including dissertation, within eight years.

15-Hour Research Requirement

Required of all students:

RSCH8210 Applied Research Methods (3)
RSCH8110 Descriptive and Inferential Statistics (3)

Three additional research courses such as the following:

RSCH8211 Qualitative Research Methods (3)
RSCH8212 Survey Research Methods (3)
RSCH8213 Single-case Research (3)
RSCH8120 Advanced Statistics (3)
RSCH8130 Presentation and Computer Analysis of Data (3)
RSCH8140 Multivariate Statistics (3)
RSCH8296 Program Evaluation Methods (3)
EDCI8113 Research in Mathematical Education (3)
EDCI8250 Applied Research in Literacy Education (3)
EDCI8061 Topics in Urban Educational Research (3)
EDCI8121 Applied Research Methods in the Teaching of English (3)
EDCI8131 Research in English Studies (3)
EDCI8132 Research in Literary Theory (3)

12-Hour Common Core

Required for all students:

EDCI8180 Critical Issues and Perspectives in Urban Education (3)
ADMN8122 Advanced Curriculum Theory (3)

Leadership in Urban Education theme. Choose **one** such as the following:

EDCI8070 Topics in Urban Educational Leadership (3)
EDCI8420 Writing Program Administration and Supervision (3)
EDCI8141 Policy-making in Literacy Education (3)
ADMN8489 Practicum in Staff Development (3)
ADMN8660 Instructional Leadership Seminar (3)

Urban-Regional Issues theme. Choose **one** such as the following:

EDCI8075 Topics in Urban-Regional Education (3)
EECI8186 Comparative Education (3)
ADMN8130 Educational Governance and Policy Studies (3)
EIST8150 Systemic Design of Educational Systems (3)
PPOL8610 Urban Regional Environment(3)
PPOL8615 The Restructuring City (3)
PPOL8681 Race, Gender, Class, and Public Policy (3)
PPOL8689 The Social Context of Schooling (3)

9 Hours of Dissertation Credit

EDCI8699 Dissertation Proposal Seminar (3)
EDCI8999 Dissertation Research (6)

24 Hours of Specialization Core (Must Include The Appropriate Readings Course)

Appropriate Readings Course

EDCI8640 Readings in Literacy Education (3)
Or
EDCI8610 Readings in Mathematics Education Research (3)
Or
EDCI8660 Readings in Urban Education Research (3)

21 hours of Specialization Courses

Advising

An advisor will be assigned to each student within the first year of studies. The Advisor along with the Doctoral Coordinator will provide initial advising until the end of the first year (12 hours) and will work with the student in developing the Program of Study. By the beginning of the second year the student is required to submit a Program of Study which is approved by the Advisor and the Doctoral Program Coordinator. Advisors will also support the student in identifying faculty whose research interests and expertise are congruent with the student's probable area of dissertation inquiry. The assistance of the Advisor does not relieve the student of responsibility for completing required work and for following departmental or university procedures. In the semester in which the student takes the Comprehensive Exam, the student will reach agreement with a faculty member to serve as Dissertation Chair. The Chair must be a member of the Curriculum & Instruction Faculty.

Admission to Candidacy Requirements

Students are considered candidates for the doctoral degree upon: (a) successful completion of the Comprehensive Examination, (b) approval of the Dissertation Proposal, and (c) submission of the Application for Candidacy form. Both the Petition for Topic Approval and the Application for Candidacy should be submitted together. Candidacy must be achieved at least six months before the degree is conferred.

Application for Degree

Students must submit an Application for Degree in the semester in which they successfully defend their dissertation proposal. Adherence to Graduate School deadlines and requirements is expected. Degree requirements are completed with the successful defense of the dissertation and file the final copy of their dissertation in the Graduate School.

Ph.D. Courses in Curriculum and Instruction

EDCI 8004. Topics in Analysis. (3) Cross-listing with MATH 6004.

EDCI 8008. Topics in Geometry and Topology. (3) Cross-listing with MATH 6008.

EDCI 8010. Advanced Topics in Mathematics Education. (3) Prerequisites: Enrollment in the Mathematics Education specialization of the Doctoral Program in Curriculum and Instruction. Advanced research topics in the teaching and learning of mathematics. Includes a survey, interpretation, and synthesis of contemporary research problems in mathematics teaching and learning. Can be repeated for credit. *(On demand)*

EDCI 8020. Topics in English Education. (3) Examination of special topics germane to English education in urban-regional environments at the elementary, middle, and secondary school levels as well as the community and four-year college, including historical perspectives on current problems, effectiveness of programs and practices in urban schools, and emerging theories on teaching and learning. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit for different topics. *(On Demand)*

EDCI 8040. Topics in Reading Education. (3) Examination of special topics germane to reading education in urban-regional environments at the elementary, middle, and secondary school levels as well as the community and four-year college, including historical perspectives on current problems, effectiveness of programs and practices in urban schools, and emerging theories of learning. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit for different topics. *(On Demand)*

EDCI 8070. Topics in Urban Educational Research. (3) Examination of the research in specific areas germane to urban educational settings and problems. Emphasis on different research questions and methodologies used to investigate similar problems. Examination of alignment of research findings with educational change in urban environments of the elementary, middle, and secondary school levels as well as the community and four-year college. May be repeated for credit for different topics. *(On Demand)*

EDCI 8070. Topics in Urban Educational Leadership. (3) Examination of special topics germane to leadership in urban education environments at the elementary, middle, and secondary school levels as well as the community and four-year college. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit for different topics. *(On Demand)*

EDCI 8075. Topics in Urban-Regional Education. (3) Examination of special topics germane to education in urban-regional environments at the elementary, middle, and secondary school levels as well as the community and four-year college. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit for different topics. *(On Demand)*

EDCI 8100. Foundations of Mathematics. (3) Cross-listing with MATH 6100.

EDCI 8101. Foundations of Real Analysis. (3) Cross-listing with MATH 6101.

EDCI 8102. Calculus from an Advanced Standpoint. (3) Cross-listing with MATH 6102.

EDCI 8103. Computer Techniques and Numerical Methods. (3) Cross-listing with MATH 6103.

EDCI 8105. Problem-Solving in Discrete Mathematics. (3) Cross-listing with MATH 6105.

EDCI 8106. Modern Algebra. (3) Cross-listing with MATH 6106.

EDCI 8107. Linear Algebra. (3) Cross-listing with MATH 6107.

EDCI 8112. Theoretical Foundations of Learning Mathematics. (3) Introductions to theories of learning that have influenced the teaching of mathematics in K-12. An overview of theories that have guided reforms in mathematics teaching; contemporary constructivist theories of mathematics learning. *(Alternate years)*

EDCI 8113. Research in Mathematics Education. (3) Prerequisites: An introduction and overview of research in the teaching and learning of mathematics in K-12. Overview of contemporary research perspectives and paradigms; interpreting and synthesizing the research literature; survey of contemporary research problems in mathematics teaching and learning; development of classroom-based research studies. *(Alternate years)*

EDCI 8115. Issues in the Teaching of Secondary School Mathematics. (3) Prerequisites: Students must be enrolled in the Masters of Arts in Mathematics Education Program. Study of major issues affecting

secondary mathematics education: analysis of the impact of learning theories on methods of teaching; assessment methods for improving mathematics learning; analysis of the historical and programmatic development of the secondary school mathematics curriculum leading to current trends, issues, and problems; and analysis of the role of technology in the secondary mathematics classroom. *(Alternate years)*

EDCI 8118. Non-Euclidean Geometry. (3) Cross-listing with MATH 6118.

EDCI 8120. Literacy and Educational Public Policy. (3) Examination of competing definitions of literacy and development of literacy practices related to debates in American education public policy about the ends of schooling, the strategies of teaching, and the priorities of the language arts curricula. Evaluation of assumptions, reasoning, and research bases linking literacy to policy. Study of the historical and current methods of establishing district, statewide and federal policies about literacy education programs, materials, personnel, grants, and licensure. *(On demand)*

EDCI 8121. Applied Research Methods in the Teaching of English. (3) Gross-listing with ENGL 6674.

EDCI 8129. Linguistics and Language Learning. (3) Cross-listing with ENGL 8263.

EDCI 8131. Research in English Studies. (3) Cross-listing with ENGL 6101.

EDCI 8132. Research in Literary Theory. (3) Cross-listing with ENGL 6102.

EDCI 8133. Multiculturalism and Children's Literature. (3) Cross-listing with ENGL 6104.

EDCI 8134. Early Black American Literature. (3) Cross-listing with ENGL 6147.

EDCI 8135. African American Literary Theory and Criticism. (3) Cross-listing with ENGL 6158.

EDCI 8137. Language and Culture. (3) Cross-listing with ENGL 6165.

EDCI 8138. Comparative Language Study. (3) Cross-listing with ENGL 6166.

EDCI 8139. Perspectives in African-American Literature. (3) Cross-listing with ENGL 62476.

EDCI 8180. Critical Issues and Perspectives in Urban Education. (3) Introduction to critical issues in urban education, from the historical roots to present crises and solutions. Examination of multiple perspectives on issues such as poverty, English as a second language, single-parent families, crime and drug abuse, school failure, discipline problems, under-preparedness for the next level of schooling, integration and re-segregation. *(Fall)*

EDCI 8183. Teaching English as a Second Language. (3) Cross-listing with TESL 6103.

EDCI 8186. Comparative Education. (3) Cross-listing with EDUC 8126.

EDCI 8250. Applied Research in Literacy Education (3) Introduction to the research interests of faculty, with emphasis on research in urban educational issues and problems. Seminar and individual support for replication attempts, instrument development and field-testing in pilot studies, practice in and critique of different methods of data-gathering and data analysis. *(On Demand)*

EDCI 8420. Writing Program Administration and Supervision. (3) Study of and supervised experiences in the development, administration, supervision, and evaluation of writing programs in urban educational settings. Students may focus on programs at the elementary, middle, or secondary schools or within community and four-year colleges. Emphasis on program development that supports writers from diverse backgrounds. *(On demand)*

EDCI 8460. Internship in Urban Education. (3) Prerequisite: Consent of instructor. Internship experiences planned and guided cooperatively by University and school personnel. *(On demand)*

EDCI 8462. Supervision of Student Teachers. (3) Concentrated practice in the supervision of student teachers with emphasis on support of student teachers in urban schools. Internship experience with direct faculty supervision in seminars and school settings. *(Spring, odd years)*

EDCI 8609. Seminar. (3) Cross-listing with MATH 6609.

EDCI 8610. Readings in Mathematics Education. (3) Prerequisites: Enrollment in the Mathematics Education specialization of the Doctoral Program in Curriculum and Instruction. Readings in the teaching and learning of mathematics K-16; analysis of the historical development of the K-16 mathematics curriculum leading to current trends, issues, and problems; theory, methods, and techniques for assessment; and analysis of contemporary issues impacting the teaching of mathematics. *(Spring)*

EDCI 8640. Readings in Literacy Research. (3) Study of methodology and findings of historical and current research about needs and characteristics of diverse literacy learners in urban-regional environments, successful programs and policies, and promising solutions

to educational challenges confronting literacy teachers and literacy learners. *(Spring)*

EDCI 8660. Readings in Urban Educational Research. (3) Study of methodology and findings of historical and current research about needs and characteristics of urban schools, diverse populations in urban-regional environments, legal and ethical issues, policy-making, and promising solutions to educational challenges of poverty, social justice, language differences, and conflicting values. *(Spring)*

EDCI 8681. Seminar in College Teaching. (3) Issues, theories, and research about teaching late adolescent and adult learners. Supervised teaching experiences with faculty who supports students as they teach or co-teach undergraduate professional education, English, or mathematics courses. *(On demand)*

EDCI 8682. Seminar in Professional and Grant Writing. (3) Introduces the forms of professional and grant writing expected of education professionals. Emphasis on writing for publication and writing for federal and state funding. Collaborative writing and peer assessment will be part of the process. *(On demand)*

EDCI 8699. Dissertation Proposal Seminar. (3) Prerequisite: Permission of Program Coordinator. Identification of a research question and development of the proposal for an original research study appropriate for the dissertation requirement. *(Spring)*

EDCI 8880. Independent Study in Urban Education. (3) Prerequisite: Permission of the student's advisor. Independent study of an urban education problem or issue under the supervision of an appropriate faculty member. May be repeated for credit. *(On demand)*

EDCI 8999. Dissertation Research. (3) Prerequisite: Committee approval of the dissertation proposal. Execution of original research study that addresses the solution to an urban educational problem in curriculum, teaching, learning, or leadership. (May be repeated for credit). *(Fall, Spring, Summer)*

EDCI 9999. Doctoral Residency Credit. (1) *(Fall, Spring, Summer)*

CURRICULUM AND SUPERVISION

Educational Administration: Curriculum Leadership

Department of Educational Leadership

Chair, Dr. J. Allen Queen
261C College of Education Building
704-687-8856
http://www.uncc.edu/colleges/education/eart/

Degree

M.Ed.

Coordinator

Dr. Corey Lock

Graduate Faculty

Corey Lock
Michael Jazzar
James Lyons
J. Allen Queen
Wayne White

MASTER OF EDUCATION IN CURRICULUM AND SUPERVISION

The M.Ed. in Curriculum and Supervision is designed to prepare highly competent program leaders for the school systems of North Carolina. UNC Charlotte is particularly dedicated to serving the 23 school districts located in the Southwestern Piedmont area of the state. To achieve its objectives, the program is designed to attract high-quality students and help them develop specific competencies to enable them to define, communicate, interpret, and assess teachers in the implementation of state and local curricula.

Program Objectives

The major educational objectives of the program are to develop instructional leaders who have advanced knowledge and skills in curriculum development and supervisory practices to assist the school system by:

1) Guiding principals and teachers in the interpretation of curriculum standards and specific competencies for instructional development.
2) Directing teachers in curriculum and instructional alignment to maximize success for the highest levels of student achievement possible.
3) Promoting the expectations that effective teachers are masters of their subject content, highly knowledgeable of human dynamics, directly responsive to individual differences in students and are well accomplished in the art and science of pedagogy and student assessment.

4) Encouraging participants in the program to self-direct their personal and professional growth as educators by:
   a) Taking responsibility for their own learning;
   b) Initiating professional inquiry through conversations with colleagues;
   c) Critically reading the professional literature;
   d) Participating voluntarily in personal and professional development opportunities; and
   e) Setting high expectations for their professional performance.
5) Guiding participants to promote in teachers the skills to respond effectively to children's differences as influenced by development, exceptionalities, and diversity by:
   a) Developing and advanced understanding of human development;
   b) Expecting and respecting differences among children that are influenced by development, exceptionalities, and diversity;
   c) Promoting understanding and respect for all members of the classroom community;
   d) Helping students, parents, and colleagues develop a global perspective; and
   e) Applying their knowledge at all levels of interaction with students: from modifying instruction for individuals to creating classroom environments where all students feel welcome and can be successful learners.
6) Demonstrating advanced knowledge of the content and pedagogy in curriculum and supervision by:
   a) Demonstrating advanced knowledge of the range of appropriate content;
   b) Helping children to acquire the knowledge and skills appropriate for specific grade levels and development through many effective instructional and assessment practices;
   c) Using technology in a variety of ways to support learning;
   d) Helping students develop competencies applicable across the curriculum; and
   e) Helping children make sense of their learning by connecting school content and students' lives outside of school and by integrating curriculum.
7) Improving educational practice through self-refection, self-evaluation, and applied research by:
   a) Engaging in study that leads to continuous improvement of teaching and learning;
   b) Actively investigating and solving educational problems through data gathering and assessment;
   c) Continuously monitoring the learning problems and successes of each learner;
   d) Making appropriate adjustments in both instruction and learning environments based on analysis of data; and
   e) Regularly monitoring the effects of their actions on academic achievement.
8) Serving as educational leaders by:
   a) Actively participating as leaders in areas in which they can contribute to solving educational problems, such as School Advisory Teams and committees in professional organizations;
   b) Taking responsibility for sharing in decision-making relative to school-wide and/or system-wide issues;
   c) Readily asking for and sharing successful instructional approaches and solutions with colleagues, supervisors, and educational leaders; and
   d) Providing mentoring for colleagues.

The Program

Today, curriculum specialist and instructional supervisors must be able to elicit support and create program structures and climates that foster the kinds of creativity, change, and innovation that will educate the most diversified group of children ever in America's schools. To meet this challenge, the M.Ed. program focuses on curriculum development. It enables candidates to develop specific competencies related to curriculum leadership, instructional practice and supervisory roles. It emphasizes performance and competence in school-based leadership and the overall quality of K-12 instruction.

The M.Ed. program provides for 33 credits of classroom study followed by an internship. In the cohort, a part-time student can complete the program in two years. Students average two courses per semester while the final six credit hours of each student's program are in the internship and a seminar. The internship semester is undertaken on a full-time basis (typically during the summer term just prior to graduation). The program faculty will work with students and school districts to arrange for the internships to be completed with minimum impact on their current positions.

General Curriculum Plan

The 39 semester-hour M.Ed. program includes nine hours of professional education core courses and 30 hours of course work in curriculum and educational administration and leadership (including academic experience in internships and seminars).

Professional Education Core Courses (9)

EIST6101	The Adult Learner
RSCH6101	Educational Research Methods
CUSU6100	Fundamentals of Educational Leadership

Core Courses in Educational Administration and Leadership (21)

CUSU6122	Foundations of Curriculum Theory and Development
CUSU6123	Designs in Curriculum Practices
CUSU6105	Legal Aspects of Schooling
EIST5000	Instructional Technology
CUSU6130	Supervision of Instruction

RSCH6196 Program Evaluation Methods
An elective or CUSU 6120: Instructional Leadership

Internship/Seminars (9)
CUSU6601 Seminar in Curriculum and Supervision
CUSU6491 Internship and Seminar: Curriculum and Supervision

Additional Admissions Requirements

In order to be considered for admission to the M.Ed. program, applicants are expected to submit the following materials to the Graduate Admissions Office:

1) A written application;
2) Evidence of a bachelor's degree or its equivalent from an accredited institution with an overall GPA of at least 3.00;
3) Two official transcripts of previous academic work attempted beyond high school;
4) A score of 50th percentile or higher on the Graduate Record Examination or the Miller Analogies test taken within the previous five years;
5) Three professional recommendations, including one from the applicant's immediate supervisor;
6) A description of previous relevant employment, including evidence of at least two years of successful teaching experience in K-12;
7) Evidence of a clear "A" level license
8) Applicant must be a full time teacher
9) A personal statement of purpose or intent for entering the program.

Applications to the program will be accepted by November 1for admission the following spring semester. The November 1deadline requires a complete admissions packet. The application process is designed to ensure selection of a highly competent and diverse cohort of students. The number admitted each year will be based on current resources, but it is expected to be approximately 20 students. Upon successful completion of the program and Praxis examination, graduates will receive a recommendation for North Carolina licensure as a Curriculum-Instructional Specialist (licensure area 113 Level I).

POST-MASTERS GRADUATE CERTIFICATE IN CURRICULUM AND SUPERVISION

Educators who hold a master's degree in an educational area and who possess an "M" level teaching certificate can apply for the 21 semester hour Advance Certificate in Curriculum and Supervision. The Advance Certificate leads to state licensure as an Instructional Specialist (licensure area 113 Level I).

The Advance Certificate program provides for 15 credits of classroom study followed by an internship. Students average one course per semester with an internship in the final semester. The internship semester is undertaken on a full-time basis. The program faculty will try to work with students and school districts to arrange for the internships to be completed with minimum impact on their current positions.

General Curriculum Plan

CUSU 6100 Fundamentals of Educational Leadership
CUSU 6122 Foundations of Curriculum Theory and Development
CUSU 6123 Designs in Curriculum Practices
CUSU 6130 Supervision of Instruction
CUSU 6601 Seminar in Curriculum and Supervision
CUSU 6491 Internship and Seminar: Curriculum and Supervision (6 hrs)

Additional Admissions Requirements

In order to be considered for admission to the Advance Certificate program, applicants are expected to submit the following materials to the Graduate Admissions Office:

1) A written application;
2) Evidence of a master's degree in education or its equivalent from an accredited institution with an overall GPA of at least 3.5;
3) Two official transcripts of previous academic work attempted beyond the bachelor's degree;
4) Three professional recommendations, including one from the applicant's immediate supervisor;
5) A description of previous relevant employment, including evidence of at least three years of successful teaching experience in K-12;
6) Evidence of a clear "M" level license;
7) Applicant must be a full time educator;
8) A personal statement of purpose or intent for entering the program.

Applications to the program will be accepted until November for admission the following spring semester. The November 1deadline requires a complete admissions packet. This process is designed to ensure selection of a highly competent and diverse group of students. The number admitted each year will be based on current resources. Upon successful completion of the program and Praxis examination, completers will receive a recommendation for North Carolina licensure as a Curriculum-Instructional Specialist, licensure area 113 level I.

Courses in Curriculum and Supervision

CUSU 6100. Fundamentals of Educational Leadership. (3) The developing role of educational organizations in the United States and the societal and cultural influences that affect the delivery of schooling. Structure and organization of American schools, administrative and organizational theory, legal, moral, and

ethical dimensions of schooling within the context of restructuring and reform. *(Spring)*

CUSU 6105. Legal Aspects of Schooling. (3) Education law for education professionals which focuses on the legal rights and responsibilities of students, teachers, and administrators and how these legal provisions affect educational policy and practice. *(Fall)*

CUSU 6122. Foundations of Curriculum Theory and Development. (3) Foundations of historical curriculum development, philosophic beliefs, and understanding of the development of the American public school system. *(Summer)*

CUSU 6123. Designs in Curriculum Practices. (3) Examines the field of curriculum with particular emphasis on the change process. *(Summer)*

CUSU 6130. Supervision of Instruction. (3) Introduction to clinical supervision and development of skills in classroom observation, analysis, evaluation, and assistance. Systems of observation, principles of adult development in school settings, techniques for conducting classroom observations and conferences, and development of staff development programs to remedy assessed weaknesses. *(Fall)*

CUSU 6601. Seminar in Curriculum and Supervision. (3) Capstone class in curricular and supervisory leadership. Exploration of seminal topics and preparation for the internship. *(Spring)*

CUSU 6490. Internship in Curriculum and Supervision. (6) Prerequisite: Department approval. Internship under the supervision of University and on-site personnel in a setting consistent with the student's professional goals in which the student will be involved in the diverse activities expected of the professional administrator. *(Summer)*

EDUCATIONAL ADMINISTRATION

Educational Administration: Principalship

Department of Educational Leadership

Interim Chair, Dawson Hancock
261-C College of Education Building
704-687-8856
http://www.uncc.edu/colleges/education/eart/

Degree

M.S.A.

Coordinator

Glenda Poole

Graduate Faculty

Professors
Bob Algozzine
John Gretes
Corey Lock
Jim Lyons
J. Allen Queen
Associate Professors
Claudia Flowers
Dawson Hancock
Richard Lambert
Ann McColl
Assistant Professors
Adam Friedman
Richard Hartshorn
Lisa Howley
Michael Jazzar
Grace Mitchell
Glenda Poole
Eric Porfeli
Chang Wang
Wayne White

MASTER OF SCHOOL ADMINISTRATION

The mission of the Master of School Administration (M.S.A.)) program is to prepare innovative, collaborative, effective, and reflective leaders who are prepared to develop school environments that ensure equitable and quality learning opportunities for a rapidly changing and increasingly diverse population and focus on improving the learning for ALL students. Program graduates qualify for two licenses; a PreK-12, Level 1 School Administrator's license (Principal) and a PreK-12, Level I Curriculum Instructional Specialist license (Supervisor).

Program Objectives

Program objectives are aligned with the approved national standards of the Educational Leaders Constituent Consortium, the North Carolina Department of Public Instruction, and the National Council for Accrediting Teacher Education. In particular there are six basic standards that serve as core curriculum components:
1) visioning for school improvement, 2) creating a positive school culture, providing an effective instructional program, and designing comprehensive professional growth plans, 3) managing the organizational, 4) collaborating with families and community, responding to diverse interests and needs, 5) acting with integrity, fairly, and equitably, and 6) interacting and influencing the larger political, social, economic, legal, and cultural context.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, applicants must have a minimum of three years successful teaching experience, a Class A North Carolina teaching license or equivalent, a statement of purpose using guidelines provided the website (see http://education.uncc.edu/EART/SchoolAdmin.html), a complete resume showing evidence of leadership, a copy of the teacher license, and recommendations from school administrators who can attest to your potential success as a school principal. Application deadline is January 15 for enrollment in either the following summer or fall semesters.

Admission decisions are based on an analysis of applicant profiles made by program faculty and clinical instructors. Applicants with the highest profile rankings are invited to participate in interviews in March. Program faculty, clinical faculty, acting principals/assistant principals, and student interns serve on interview teams. These interviews are designed to provide the applicant an opportunity to show evidence of academic strengths, leadership potential, and personal characteristics. After the interview, the applicant will provide a writing sample from a given prompt.

The Master of School Administration Program faculty is committed to achieving diversity among the students admitted in each year's cohort group and will make admission decisions accordingly. The Graduate School will notify applicants of their admission status by mid-April.

Degree Requirements

The M.S.A. program requires a total of 48 hours in a combination of courses in educational leadership, research, technology, curriculum, and instruction. All students must complete a ten-month, full-time internship under the direction of a principal-mentor and a university supervisor. Prior to beginning the internship, the student must pass a written comprehensive examination. The exam challenges students to demonstrate a thorough and well-integrated understanding of the basic principles, research findings, and theories covered in their course work and apply these to educational practice and leadership situations.

Courses

ADMN6000	Topics in Educational Leadership (3)
ADMN6100	Fundamentals of Educational Leadership (3)
ADMN6105	Legal Aspects of Schooling (3)
ADMN6120	Instructional Leadership (3)
ADMN6130	Supervision of Instruction (3)
ADMN6140	Curriculum Leadership (3)
ADMN6161	The Principalship (3)
ADMN6410	Internship and Seminar Part I (6)
ADMN6420	Internship and Seminar Part 11 (6)
RSCH6101	Educational Research Methods (3)
RSCH7196	Educational Program Evaluation Methods (3)
EIST5100	Computer Applications in Education (3)
EIST6101	The Adult Learner (3)
Elective	3 Credit Hours at the 6000 or higher level

Capstone Experiences

The full-year internship requires the productive application of knowledge, skills, and dispositions, to the problems of practice. The experience provides a multitude of opportunities for the intern to progressively develop administrative competence. Interns are guided through their experience by their school-site mentor and university clinical supervisor.

Principal Fellows

Each year a limited number of scholarship/loans for persons seeking an M.S.A. as full-time students are available from the North Carolina Principal Fellows Program (http://www.ga.unc.edu/Principal Fellows/). Funded by the North Carolina General Assembly to help highly qualified persons study school administration on a full-time basis, the program provides $40,000 over a two-year period and requires repayment with either four years of service as a school administrator in a North Carolina public school or monetary reimbursement of the original loan, plus interest.

Courses in Educational Administration

ADMN 6000. Topics in Educational Administration. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

ADMN 6100. Fundamentals of Educational Leadership. (3) The developing role of educational organizations in the United States and the societal and cultural influences that affect the delivery of schooling. Structure and organization of American schools, administrative and organizational theory, legal, moral, and ethical dimensions of schooling within the context of restructuring and reform. *(Fall)*

ADMN 6105. Legal Aspects of Schooling. (3) Education law for education professionals which focuses on the legal rights and responsibilities of students, teachers, and administrators and how these legal provisions affect educational policy and practice. *(Spring)*

ADMN 6106. Legal Issues in Special Education. (3) Survey of federal and state statutory and administrative provisions governing the delivery of education and related services to exceptional students. *(On demand)*

ADMN 6107. School Law for Counselors and Related Professionals. (3) Legal issues and problems of special relevance to school counselors, psychologists, social workers, and related professionals who work with school-age children. *(On demand)*

ADMN 6110. School Leadership and Management. (3) Examination of school leadership and administration, focusing on the role, tasks, and responsibilities that accompany school-based leadership. *(Summer)*

ADMN 6120. Instructional Leadership. (3) Examination of research-based teaching/learning models and the relationship between instructional decisions and curriculum experiences. Dynamics of group development and problems/practices related to providing instructional assistance to teachers. *(Summer)*

ADMN 6130. Supervision of Instruction. (3) Corequisite: ADMN 6410. Introduction to clinical supervision and development of skills in classroom observation, analysis, evaluation, and assistance. Systems of observation, principles of adult development in school settings, techniques for conducting classroom observations and conferences, and development of staff development programs to remedy assessed weaknesses. *(Fall)*

ADMN 6140. Curriculum Leadership. (3) Examination of internal and external influences on curriculum formation and development at the building level with emphasis on development of administrative strategies for curriculum decision-making which are driven by staff involvement. *(Spring)*

ADMN 6161. The Principalship. (3) Examination of school administration focusing on the role, task and responsibilities associated with the principalship with special attention to the conceptual, human and technical skills associated with the principal. *(On demand)*

ADMN 6166. Educational Leadership. (3) Examination of leadership in formal organizations and social and behavioral science research concerning leadership ability with emphasis on educational organizations and the role of the leader in the accomplishment of organizational goals. *(On demand)*

ADMN 6410. Internship and Seminar Part I. (3-9) Corequisite: ADMN 6130. Full-time, academic year internship in educational administration designed to allow theoretical and course-based practical learning to be translated and interwoven into a supervised field-based experience. *(Fall)*

ADMN 6420. Internship and Seminar Part II. (3-9) A continuation of the internship experiences and seminar begun in ADMN 6410. *(Spring)*

ADMN 6490. Internship and Seminar: Administration. (3-6) Prerequisite: Department approval. Internship under the supervision of University and on-site personnel in a setting consistent with the student's professional goals in which the student will be involved in the diverse activities expected of the professional administrator. Seminars are held concurrently. *(On demand)*

ADMN 6491. Internship and Seminar: Supervision. (3-6) Prerequisite: Permission of the department. Internship under the supervision of University and on-site personnel in a setting consistent with the student's professional goals in which the student will be involved in the diverse activities expected of the curriculum-instructional specialist. Seminars are held concurrently. *(On demand)*

ADMN 6601. Seminar in Administration and Supervision. (1-3) Prerequisite: Permission of the department. Examination of selected areas of interest in educational administration and supervision. May be repeated for credit with departmental approval. *(On demand)*

ADMN 6800. Individual Study in Educational Administration. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

EDUCATIONAL LEADERSHIP

Advanced Educational Leadership

Department of Educational Leadership

College of Education
Suite 261 College of Education Building
704-687-8730
http://education.uncc.edu/eart

Degree

Ed.D.

Coordinator

Dr. Grace Mitchell

Graduate Faculty

Robert Algozzine, Professor
Claudia Flowers, Associate Professor
Adam Friedman, Assistant Professor
John Gretes, Professor
Dawson Hancock, Associate Professor
Richard Hartshorne, Assistant Professor
Lisa Howley, Assistant Professor
Michael Jazzar, Assistant Professor

Richard Lambert, Associate Professor
Corey Lock, Professor
James Lyons, Professor
Ann McColl, Associate Professor
Grace Mitchell, Assistant Professor
Glenda Poole, Assistant Professor
Erik Porfeli, Assistant Professor
J. Allen Queen, Professor
Chuang Wang, Assistant Professor
Wayne White, Assistant Professor

ED.D. IN EDUCATIONAL LEADERSHIP

The Ed.D. program in Educational Leadership is designed to prepare educational administrators who can assume mid-level and senior-level leadership positions in pre-collegiate educational or non-public school settings. The program includes two specializations, a school specialization and community specialization.

Program Objectives

Graduates of the program are prepared to:

1) exhibit a broad understanding of their roles as educational leaders in the organizations they serve.
2) demonstrate leadership competencies and skills necessary to accomplish the goals of complex organizations.
3) interact successfully with the numerous institutions and interests that influence their organizations
4) understand theoretical concepts that under gird organizational theory and behavior, leadership, social psychology, policy development, and organizational change.
5) address basic issues that face educational leaders, including resource acquisition and management, policy development and analysis, program management, personnel selection and evaluation, community relations and curriculum development.

Note to Students in School Specialization: The Department of Educational Leadership follows the standards and guidelines of the ISLLC / ELCC for the school specialization. A complete copy of the standards and guidelines are available at the following web sites:

http://www.npbea.org/ELCC/
http://www.ccsso.org/projects/Interstate_School_Leaders_Licensure_Consortium/

Ed.D. in Educational Leadership

School Specialization

Superintendent Focus and Curriculum/Supervision Focus

Overview

The program is designed to serve the needs those interested in the study of issues regarding the administration of PK-12 public and private educational institutions. These students pursue careers as superintendents and senior level administrators. In addition to the program requirements regarding leadership experiences, (see below), these prospective students must hold a Master of School Administration, Master of Education in Curriculum Supervision, Master of Education in Instructional Technology, or a comparable program. These students must already have a valid certificate in an appropriate field. Appropriate PK-12 North Carolina licensure will be recommended at graduation. A Superintendent Focus or Curriculum / Supervision Focus may be chosen by working with your advisor and selecting the courses and experiences required for the licensure selected.

The Ed.D. program consists of a minimum of 60 credit hours beyond the master's degree:

1) 15 semester hours in RSCH Prefix Courses:
   RSCH 8210 Applied Educational Research
   RSCH 8110 Descriptive/Inferential Statistics
   RSCH 8120 Advanced Statistics
   ADMN 8699 Proposal Development
   One Research Elective Courses (Work with your advisor)
2) 33 semester hours of specialization coursework which includes one of the following areas of focus: Educational Leadership/Superintendency; Curriculum Leadership and Instructional Supervision. See complete listing of courses for each focus
3) 6 semester hours of electives *
4) 6 semester hours of dissertation credits **

*Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator is required.
**Students continue to enroll in dissertation study until the completion of the degree.

Ed.D. in Educational Leadership

Community Specialization

Overview

The mission of the Department of Educational Leadership is to prepare educators as leaders. This program within the department emphasizes leadership in the areas of curriculum development and instructional supervision in non public school settings. It is designed for those interested in careers as senior level administrators in educational organizations or for those whose professional responsibilities relate to the supervision of instruction in other contexts. To ensure the effectiveness and competence of individuals in such positions, coursework within the program also reflects the need for proficiency in program design, evaluation and research.

Prospective students should already have a Master's degree in an appropriate and related field. They are not required to hold N.C. PK-12 licensure nor will any license or certificate be recommended upon graduation.

This Ed.D. program consists of a minimum of 60 credit hours beyond the Master's degree in the following areas:
15 Semester Hours - Foundations Coursework*
33 Semester hours - Specialization Coursework
15 Semester Hours - Ed. Research and Evaluation
18 Semester Hours - Subspecialty Coursework
6 Semester Hours - General Electives**
6 Semester Hours - Dissertation Coursework***

*Suggested Foundations Coursework
- ADMN 8160 Educational Leadership
- EIST 8101 Adult Learner
- ADMN 8121 Doctoral Seminar in Curriculum Design
- ADMN 8660 Instructional Leadership Seminar
- ADMN 8110 Organizational Theory and Behavior

**Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator is required.
***Students continue to enroll in dissertation study until the completion of the degree.

School and Community Specializations Degree Requirements

School Specialization
Superintendent Focus
Foundations and Specialty: 33 Semester Hours
- ADMN8610 Interdisciplinary Seminar
- ADMN8160 Educational Leadership
- ADMN8121 Doctoral Seminar in Curriculum Design
- ADMN8140 Advanced School Finance
- ADMN8130 Educational Government & Policy
- ADMN8110 Organization Theory & Behavior
- ADMN8120 Advanced School Law
- EIST8101 The Adult Learner
- ADMN8150 Human Resources & Development
- ADMN8410 Adv Internship in Educational Leadership Part 1
- ADMN8420 Adv Internship in Educational Leadership Part 2

Research: 15 Semester Hours
- RSCH8210 Applied Educational Research
- RSCH8110 Descriptive/Inferential Statistics
- RSCH8120 Advanced Statistics
- ADMN8699 Proposal Design
- Research Elective 3 Semester Hours

Dissertation 6 Semester Hours
- ADMN8999 Dissertation**

Electives 6 Semester Hours *
*Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator are required.
**Students continue to enroll in dissertation study (a minimum of 6 hours) until the completion of the degree.

School Specialization
Curriculum & Supervision Focus
Foundations and Specialty: 33 Semester Hours
- ADMN8610 Interdisciplinary Seminar
- ADMN8160 Educational Leadership
- ADMN8121 Doctoral Seminar in Curriculum Design
- ADMN8140 Advanced School Finance
- ADMN8125 Doctoral Seminar in Instruction
- ADMN8660 Instructional Leadership Seminar
- ADMN8122 Advanced Curriculum Theory and Development
- ADMN8120 Advanced School Law
- EIST8101 The Adult Learner
- ADMN8489 Practicum in Staff Development
- Specialization Elective 3 Semester Hours

Research 15: Semester Hours
- RSCH8210 Applied Educational Research
- RSCH8110 Descriptive/Inferential Statistics
- RSCH8120 Advanced Statistics
- ADMN8699 Proposal Design
- Research Elective 3 Semester Hours

Dissertation 6 Semester Hours
- ADMN8999 Dissertation**

Electives 6 Semester Hours*
*Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator are required.
**Students continue to enroll in dissertation study (a minimum of 6 hours) until the completion of the degree.

Community Specialization
Foundations and Specialty: 33 Semester Hours
- ADMN8160 Educational Leadership
- EIST8101 The Adult Learner
- ADMN8121 Doctoral Seminar in Curriculum Design
- ADMN8660 Instructional Leadership Seminar
- ADMN8110 Organizational Theory
- 18 Semester Hours of Specialty Coursework

Research 15: Semester Hours
- RSCH8210 Applied Educational Research
- RSCH8110 Descriptive/Inferential Statistics
- RSCH8196 Program Evaluation
- ADMN8699 Proposal Design
- Research Elective 3 Semester Hours

Dissertation 6 Semester Hours
- ADMN8999 Dissertation**

Electives 6 Semester Hours *
*Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator are required.

**Students continue to enroll in dissertation study (a minimum of 6 hours) until the completion of the degree.

Additional Admission Requirements

School Specialization
In addition to the general requirements for admission to the Graduate School, applicants must have a master's degree from an accredited institution. Candidates must have an entry-level license in educational administration or supervision; and they must have a minimum of three years of successful leadership experience, which may include the full-time internships. Applicants must also submit a personal essay of purpose; a description of their previous relevant employment, highlighting their leadership experiences in school-settings; and recommendations from school administrators and former university instructors.

Admission decisions are based on a comparison on of applicant profiles and are made by a departmental admissions committee that includes program faculty. Applicants with the highest profile rankings are invited to participate in interviews that are conducted by the Ed.D. Admissions Committee is designed to provide evidence of an applicant's academic strength, leadership potential, and personal characteristics. Admission decisions are based not only on the comparative profiles of all applicants, but also on the commitment of the Admissions Committee to achieve diversity among the students admitted in each year's cohort group. Admission decisions are made in the spring, with the expectation that admitted students will begin their course work in the summer.

Community Specialization
In addition to the general requirements for admission to the Graduate School, applicants must have a master's degree from an accredited institution. Applicants must have a minimum of three years of documented successful work related experience. They must also submit a personal essay. The applicant should provide a statement of purpose, description of previous relevant employment, and the nature of previous educational experiences in the essay. Recommendations from employers and former university instructors are required.
Admission decisions are competitive. These decisions are made by a departmental admissions committee that includes program faculty. Applicants with the highest profile rankings are invited to participate in interviews that are conducted by the Ed.D. Admissions Committee is designed to provide evidence of an applicant's academic strength, leadership potential, and personal characteristics. Decisions are based not only on the comparative profiles of all applicants, but also on the commitment of the Admissions Committee to achieve diversity among the students admitted each year. Admission decisions are made in the spring of each year.

Admission to Candidacy Requirements
Students are recommended for admission to candidacy after successfully completing the written and oral comprehensive examination.

Internships
All students (in the School Specialization) seeking licensure are required to complete an internship or practicum in a K-12 school district. The internship is based upon identified objectives and organizational areas within the school system of the internship assignment. Students are also required to complete a project based upon a current educational leadership topic related to student achievement.

Advising
Doctoral students will have the benefit of three phases of advising as they pursue their degree.

Phase 1: The doctoral coordinator will serve as the "temporary advisor" when students enter the program. During this phase, the advisor plans a course of study with students during the initial stages of the program. A Program Planning Sheet is used to document tentative plans for projected coursework. The planning sheet should be kept by the student and a copy should be provided to the advisor.

Phase 2: At the beginning of the second semester but no later than the end of the first year of the program, students will select a "program advisor" to serve as a guide through the completion of the coursework. This person will also serve as the coordinator of the process to complete the Qualifying Comprehensive Examinations. This advisor also helps the student identify faculty whose research interests and expertise are congruent with the student's probable area of inquiry for the dissertation. This advisor in consultation of the student has the responsibility for creating a "doctoral committee" that will be made up of the faculty who will prepare and evaluate the written and oral comprehensive qualifying exam. (See Qualifying Comprehensive Examination section of the Handbook.

The responsibility of the doctoral committee members includes:
1) the approval of the student's course of study
2) approval of the dissertation proposal and
3) evaluation of the final dissertation and oral defense.

Phase 3: Upon successful completion of the Qualifying Comprehensive Examinations, students are recommended for admission to candidacy. They may then select a "dissertation advisor" and a dissertation committee and complete a "Change of Advisor Form" if needed. These committee members are appointed to serve on the committee with mutual consent between the student and each faculty member. The committee consists of four members of the Graduate Faculty: the Chairperson and two other members from the

Department and one member appointed by the Graduate School from outside the College of Education.

The purpose of this process is to provide students with an opportunity to develop a direct working relationship with several faculty members. At the same time, it provides an individualized and personalized approach to the advising process. For example, some students may choose to keep the same faculty member to serve as both the program advisor and the dissertation advisor. Likewise, the doctoral committee and the dissertation committee could include some or all of the same faculty.

Comprehensive Examination

Students are required to successfully pass a written and oral examination. The examination is based upon the core areas of the respective specializations.

Dissertation

Students must complete and defend a dissertation focused on a specific problem or question relevant to their specialization. Students must be continually enrolled in ADMN 8999 (3 hrs) (fall, summer and spring sessions) for dissertation research credit, beginning with the semester following completion of the comprehensive examination and continuing through the semester of their graduation. Defense of their dissertation is conducted in a final oral examination that is open to members of the University community.

Application for Degree

Students may submit an Application for Degree during the semester in which they successfully defend their dissertation proposal. Adherence to Graduate School deadlines is expected. Degree requirements are completed when a student successfully defends the dissertation and files the final copy of the dissertation in the Graduate School.

Program Certification/Accreditations

National Council for the Accreditation of Teacher Education (NCATE)
North Carolina Department of Public Instruction (NCDPI)

Courses In Educational Leadership

<u>Doctoral Students Only</u>

ADMN 8000. Topics in Educational Leadership.(1-6) Requires departmental approval may be repeated for credit for different topics. *(Fall, Spring, Summer)*

ADMN 8110. Organizational Theory and Behavior. (3) Prerequisite: Admission to Ed.D. program in Educational Leadership. Analysis of the structure and organization of public education in the United States in terms of organizational theory and historical development. Consideration of organizational change theory, organizational development, and the planning process. *(Fall)*

ADMN 8120. Advanced School Law. (3) Prerequisite: ADMN 6105 or 6107 or permission of the instructor. Current policy issues, including educational finance, testing/grouping, desegregation/integration, and the provision of public educational services to private-school students. *(Spring)*

ADMN 8121. Doctoral Seminar in Curriculum Design. (3) Examination of principles and practices for educational leaders in program design, implementation and evaluation. *(Spring)*

ADMN 8122. Advanced Curriculum Theory & Development. (3) An examination of philosophic thought and its relationship to educational theories which have led to assumptions for educational practices in American schools. *(Fall)*

ADMN 8125. Doctoral Seminar in Instruction. (3) Analysis of models of teaching and the match between attributes of the models and the instructional outcomes desired by the teacher. *(Summer)*

ADMN 8130. Educational Governance and Policy Studies. (3) Prerequisite: Admission to Ed.D. program in Educational Leadership. An examination of the institutional structure for policy-making in American education and the theories, models and practices that relate to policy-making in education. *(Summer)*

ADMN 8140. School Finance. (3) Prerequisite: Admission to Ed.D. program in Educational Leadership or permission of instructor. An examination of the theory and operation of public school finance systems and school business administration with special attention to local, state, and federal sources of revenue and such business functions as budgeting and financing capital outlay projects. *(Summer)*

ADMN 8150. Human Resources Development and Administration. (3) Prerequisite: ADMN 8110 or initial licensure as school administrator. Examination of personnel administration in educational institutions, including administration of personnel at the school district level and its contribution to the overall management and operation of a school system. *(Fall)*

ADMN 8160. Introduction to Educational Administration. (3) Examination of behavioral components of administrative theory, organization, decision-making and planning for educational development including appraisal of significant functions, techniques, practices and problems as they relate to public school systems, social institutions, and the system of social and governmental agencies. *(Fall)*

ADMN 8410. Advanced Internship in Educational Leadership Part I. (3) Prerequisites: ADMN 8110, 8120, 8130, and 8140. Internship experiences planned and guided cooperatively by University and school personnel, including some work in private, community, or social service organizations. Accompanying cohort seminar for integrating and synthesizing knowledge and skills useful to practicing school leaders. *(Fall)*

ADMN 8420. Advanced Internship in Educational Leadership Part II. (3) Prerequisite: ADMN 8410. Continuation of ADMN 8410. *(Spring)*

ADMN 8489. Practicum in Staff Development. (3) Examination of techniques of delivering in-service training and development of leadership for in-service educational programs including design and implementation of a staff development program in a school setting. *(Spring)*

ADMN 8610. Interdisciplinary Seminar. (3) Prerequisite: Admission to Ed.D. program in Educational Leadership. Ideas, values, cultures, and contemporary issues affecting society generally and education particularly and principles and practices for responding to the publics with whom school leaders interact. May be repeated for credit. *(Summer)*

ADMN 8660. Instructional Leadership Seminar. (3) Prerequisite: EDUC 8122. Investigation and evaluation of current trends and issues in supervision as they relate to the role of the educational leader, with special attention to the role of facilitating the teaching/learning process. *(Summer)*

ADMN 8695. Advanced Seminar in Teaching and Learning. (3) Examination of a number of current teaching models to provide a framework for choosing those appropriate for a given classroom setting with special attention to the relationship between teaching strategies and learning outcomes. *(Spring)*

ADMN 8699. Dissertation Proposal Seminar. (3) Prerequisite: Completion of research requirements. Identification and definition of a research area and development of a proposal draft for an original research study appropriate for the dissertation requirement. *(Fall, and On Demand)*

ADMN 8800. Individual Study in Educational Administration. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

ADMN 8999. Dissertation Research. (3) Prerequisite: Consent of Ed.D. program coordinator. Execution of original research study that addresses the solution to an educational or school-related problem or that addresses a substantive educational leadership or programmatic issue. *(Fall, Spring, Summer)*

EIST 8101. The Adult Learner. (3) The focus of this course will be on the examination of how adults learn in instructional settings. Characteristics of the adult learner will be examined. Students will investigate adult learning theory as well as current trends and advancements in adult learning. The focus will be on making better instructional decisions and media selection for the education and training of adults. *(Fall, Summer)*

ELEMENTARY EDUCATION

Department of Reading and Elementary Education

367 College of Education Building
704-687-8889

Degree

M.Ed.

Coordinator

Dr. Jack Piel

MASTER OF EDUCATION IN ELEMENTARY EDUCATION

The master's (M.Ed.) program in Elementary Education is a K-6 instructional degree that leads to the "M" level teaching license. This 39-hour program promotes the following strands of competence:

1) **Instructional Leader and Mentor**
This degree program enables graduates to develop leadership/mentorship skills

2) **Career Path for Teachers as Educational Leaders**
Learn "best practices" for instructional tactics based on current research findings in education. Completion of this degree program will enable graduates to advance up the pay scale through a 10% salary increase.

3) **National Board Certification Alignment**
Completion of this program will assist graduates in the pursuit of National Board Certification.

Program Goals

Master teachers are self-directed in their personal and professional growth as educators.

Master teachers are responsive to children's differences influenced by development, exceptionalities, and diversity.
Master teachers are well-grounded in the content and pedagogy of the entire elementary curriculum.
Master teachers are elf-reflective, self-evaluative, and educational researchers.
Master teachers are collaborative educational leaders.

Instructional Phases

This degree program is organized so that students will become instructional leaders through:

1) Phase I Developing Perspectives
Thirteen (13) hours of Professional, Theoretical, and Research coursework applicable to elementary education. This coursework establishes the basis for Phase II and Phase III.

2) Phase II Content and Pedagogy
Sixteen (16) hours of coursework based on current research findings. Graduates will investigate and share effective instructional practices designed to improve learning in the classroom.

3) Phase III Collaborative Leadership
Four (4) hour block of coursework developed to help students achieve the necessary skills to become instructional leaders and mentors within a public school setting.

Electives
Six (6) hour requirement selected from a variety of course offerings designed to allow teacher leaders to guide their own learning relative to goals and interests

Phase I. Developing Perspectives
Complete Phase I core requirements according to approved plan before beginning Phase II. Note Prerequisite for ELED 6220 (ELED 6101).

Requirements (13 hours)

ELED6101	Applications of Theories of Human Development and Learning (3)
RSCH6101	Educational Research Methods (3)
ELED6111	Critical Issues in Elementary Education (3)
ELED6220	Integrating the Elementary Program (3)
ELED6691A	Seminar in Professional and Leadership Development (1)

Phase II: Content and Pedagogy
Complete requirements of Phase II according to your approved plan before Phase III.

Requirements (16 hours)

EDUC6254	Individualizing Instruction for Diverse Learners (3)
ELED6221	Teaching and Learning K-6 Science (3)
ELED6241	Teaching and Learning K-6 Social Studies (3)
ELED6252	Teaching and Learning K-6 Mathematics (3) or 6255 Math CAMMP (3)
READ6250	Language Development and Reading (3)
ELED6691B	Seminar in Professional and Leadership Development (1)

Courses in Elementary Education

ELED 6000. Topics in Elementary Education. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

ELED 6101. Applications of Theories of Human Development and Learning. (3) Review of paradigms of human development theory as a basis for identifying and clarifying teachers' beliefs about development and learning. Analysis and subsequent improvement of alignment of teachers' instructional practices to their chosen theoretical paradigms. *(Fall, Spring)*

ELED 6111. Critical Issues in Elementary Education. (3) Three categories of instructor-and student-selected issues: government, governance, and the elementary schools; changing educational roles of professional educators, parents, and children; and the evolving missions of elementary schools. Focus on the self as learner and the re-examination of one's beliefs, teaching practices, and learning in multiple contexts. *(Fall) (Summer)*

ELED 6220. Integrating the Elementary Program. (3) Prerequisite: ELED 6101. Theoretical and historical roots of the integrated curriculum, factors which have supported or constrained implementation of this model, and methods for meaningful curriculum integration across subject areas and home/school cultures. *(Spring) (Summer)*

ELED 6221. Teaching and Learning K-6 Science. (3) Prerequisites: Completion of Phase One. Critical reading and use of the literature in science education, examination of science content taught in the elementary school, multiple models and approaches for teaching and assessing learning in science, required action research project. *(Fall)*

ELED 6241. Teaching and Learning K-6 Social Studies. (3) Prerequisites: Completion of Phase One. Critical reading and use of the literature in social studies education, examination of social studies content taught in the elementary school, multiple models and approaches for teaching and assessing learning in social studies, required action research project. *(Spring)*

ELED 6251. Teaching and Learning Mathematics. (3) Prerequisite: core requirements. Examination of the K-6 mathematics curriculum, including a critical analysis of research literature related to problem solving processes and mathematics learning. *(Yearly) (Evenings)*

ELED 6252. Teaching and Learning K-6 Mathematics. (3) Prerequisite: Completion of Phase One. Critical reading and use of the literature in mathematics education, examination of mathematics content taught in the elementary school, multiple models and approaches for teaching and assessing learning in mathematics, required action research project. *(Fall, Spring)*

ELED 6255. Math CAMMP. (3) Computer Applications and Manipulative Mathematics Program. Examination of constructivism in K-8 mathematics teaching, with emphasis on concrete, representational, and symbolic manipulatives; developmentally appropriate computer software; developmentally appropriate instructional tactics; and preparing a thematic instructional module. The course culminates in a week long practicum with elementary students. *(Summer)*

ELED 6470. Elementary Education Clinical Experience. (3-6) Prerequisite: Department approval. Program of experiential learning activities in an approved school setting (K-6). Departmental approval required. *(On demand)*

ELED 6474. Advanced Practicum in Teaching, Learning, and Leadership. (3) Prerequisites: Completion of Phase I and II courses and permission of the department. Advanced study, consideration, selected application, and evaluation of principles and practices which master teachers use to mentor the professional development of peers, collaborate with others, influence educational practices beyond their own classrooms, and support elementary students' development of competence and responsibility for their own learning and behavior. *(Fall, Spring)*

ELED 6691. Seminar in Professional and Leadership Development. (1) Seminar focused on the self-direction and collaboration of teachers as they design, develop, and present their individual program plans, their basic program portfolio, and their capstone experience of the Master's Research Project or Comprehensive Portfolio. (Must be repeated once per program phase, for a total of 3 credit hours.) *(Spring)*

ELED 6800. Individual Study in Elementary Education. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

ELED 7999. Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. *(Fall, Spring)*

INSTRUCTIONAL SYSTEMS TECHNOLOGY

Department of Educational Leadership

College of Education
Suite 261 College of Education Building
704-687-8730
http://education.uncc.edu/ist

Degree

M.Ed. In Instructional Systems Technology

Coordinator

Dr. John Gretes
043 College of Education Building
(704) 687-8810

Faculty

Adam Friedman, Assistant Professor
John Gretes, Professor
Richard Hartshorne, Assistant Professor

MASTER OF EDUCATION IN INSTRUCTIONAL SYSTEMS TECHNOLOGY

Designed for both teachers in public or private schools and persons in the private sector who wish to increase their instructional technology skills and who seek to develop skills for designing and implementing curriculum and instructional strategies that incorporate instructional systems technology. The M.Ed. Program in Instructional Systems Technology qualifies graduates who already hold either an "A" or "G" level teaching license from the North Carolina Department of Public Instruction (or from another state) for the new Masters/Advanced "M" license in Instructional Technology Specialists: Computers (NC 077) license as well as the Curriculum and Instructional Specialist (NC 113) "M" level license with additional coursework in Curriculum and Supervision. Students should work with an advisor to complete these requirements. Students interested in the Curriculum and Instructional Specialist (NC 113) "M" level license should apply for the Graduate Certificate Program in Curriculum and Supervision.

Program Objectives

Aligned with the 1997 North Carolina Excellent Schools Act and the propositions of the National Board for Professional Teaching Standards, the program prepares graduates to:

1) integrate appropriate technology into learning systems;
2) undertake instructional analyses that include task analysis, audience analysis, instructional environment analysis, and both target enabling objectives and measures;
3) identify criteria, strategies, services, and information sources for hardware and courseware evaluation, selection, and integration;
4) plan, develop, revise, and evaluate courseware using a standard planning process and accepted standards and criteria;
5) evaluate instructional technology systems;
6) work effectively as members of a design and development team that generates solutions to instructional problems; and
7) provide leadership in the field of instructional systems technology systems.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, applicants seeking the new Master's/Advanced Competencies "M" license in Instructional Technology Specialist: Computers must already hold either an "A" or "G" level teaching license from the North Carolina Department of Public Instruction (or its equivalent from another state).

Given the nature and size of the graduate degree program, applicants are only admitted for the Fall of each year. Each entering group of students will be provided a sequence of course offerings for the program. This allows students to know when the courses they will need are offered. Please contact the Graduate School for application deadlines.

Degree Requirements

The M.Ed. Program in Instructional Systems Technology requires a total of 39 hours of courses of foundations courses (18 hours), instructional development courses (6 hours), internship and seminar (6 hours), plus related coursework (9 hours). Students must also complete the "Capstone" experience described below. Students interested in adding the Curriculum and Instructional Specialist (NC 113) "M" level license will need to take additional coursework to complete the Graduate Certificate in Curriculum and Supervision that could include as much as 18 semester hours of additional coursework.

Foundations I (9 hours)

EIST6101	The Adult Learner (3)
RSCH6101	Educational Research and Evaluation (3)
EIST6100	Readings in IST (3)

Foundations II (9 hours)

EIST6110	Instructional Design (3)
EIST6135	Learning, Media, Resources and Technology (3)
EIST6121	Instructional Courseware Authoring (3)

Instructional Development (6 hours)

EIST6130	Instructional Development Part I (3)
EIST6140	Instructional Development Part II (3)

Internship Seminar (6 hours)

EIST6491	Internship and Seminar IST Part I (3)
EIST6492	Internship and Seminar IST Part II (3)

Related Coursework (9 hours)
Courses may be selected from the following categories and must be approved by the student's advisor: educational research and evaluation, MIS, technical writing, curriculum and instruction, computer systems and networking, administration and supervision courses. Students should work with an advisor to determine the related coursework that works best in their program of study. For the most current approved courses please visit our website at http://education.uncc.edu/ist.

Capstone Experience

Students must complete a Master's Project or Thesis. The project may take the form of a thesis, research study, or program development activity. The project is followed by an oral examination in which the student clarifies, expands, and defends his or her master's project. Please contact the Graduate School for information regarding the Thesis requirements. For more specific information regarding the Master's Project or Thesis please visit the following websites: http://education.uncc.edu/ist

Licensure

Instructional Technology Specialist (North Carolina 077)

Program Certification / Accreditations

National Council for the Accreditation of Teacher Education (NCATE)
Association for Educational Communications and Technology (AECT) (with National Recognition)
North Carolina Department of Public Instruction (NCDPI)

Courses In Instructional Systems Technology

EIST 5100. Computer Applications in Education. (3) Computer systems and software for enhancing teaching, learning, and educational management; evaluating, selecting, and integrating courseware; focus on current PC operating system, word processing, database, spreadsheet, presentation, Internet, e-mail, and multimedia software. *(Fall, Spring, Summer)*

EIST 6000. Topics in Instructional Systems Technology. (1-6) May include classroom and/or clinic experiences in the content area. With department

approval, may be repeated for credit in different topics. *(Fall, Spring, Summer)*

EIST 6100. Reading in Instructional Systems Technology. (3) Contemporary issues and trends in instructional systems technology, including foundations in learning research, instructional systems design, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization. Differentiated assignments for Doctoral students. *(Fall)*

EIST 6101. The Adult Learner. (3) The focus of this course will be on the examination of how adults learn in instructional settings. Characteristics of the adult learner will be examined. Students will investigate adult learning theory as well as current trends and advancements in adult learning. The focus will be on making better instructional decisions and media selection for the education and training of adults. . Differentiated assignments for Doctoral students. *(Fall, Summer)*

EIST 6102. Readings in Research in Instructional Systems Technology. (3) Current issues and trends in instructional systems technology research including instructional systems design, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization. Differentiated assignments for Doctoral students. *(On Demand)*

EIST 6110. Instructional Design. (3) Prerequisites: EDUC 6100 and RSCH 6101. Instructional Design and evaluation principles are included and examine Goal and task analysis, analysis of audience, flow chart development, instructional strategies, selection and development of instructional materials, formative and summative evaluation.*(Spring)*

EIST 6120. Current Trends in Instructional Systems Technology. (3) The focus of this course will be on the examination current and future trends in Instructional Systems Technology and Human Performance Consulting. Students will examine the most current literature in the filed. Students will examine the instructional technology professional organization trends and recommendations. Differentiated assignments for Doctoral students. *(On Demand)*

EIST 6121. Instructional Courseware Authoring. (3) Planning and developing instructional computer courseware using an authoring system to produce courseware that has application in the learning environment. *(Fall)*

EIST 6130. Instructional Development Part I. (3) An introduction to the instructional development process using design team roles of instructional designer, evaluator, technical writer, media support person, and project manager; students develop an instructional materials package (module) to meet a simulated need. *(Fall)*

EIST 6135. Learning Media, Resources and Technology. (3) Selection, use and evaluation of technological innovations in instructional media. *(Spring)*

EIST 6140. Instructional Development Part II. (3) Prerequisite: EIST 6130. Practical application of the instructional development process using design team roles of instructional designer, evaluator, technical writer, media support person, and project manager; students develop an instructional materials package (module) to meet a real need. *(Spring)*

EIST 6150. Systemic Design of Educational Systems. (3) Concepts and principles of the systemic analysis and design of educational systems will be covered. Emphasis will be given to the analysis of educational systems and the educational/societal trends that impact the systemic design of educational systems. Differentiated assignments for Doctoral students. Prerequisites: RSCH 6101 or RSCH 6110/8110 *(On Demand)*

EIST 6160. Design of Educational Information Systems. (3) Fundamentals of and planning for educational data systems will be covered. Topics covered will include networking technologies, Internet technologies, firewall technologies, distance education systems, and Information Systems models. Current and future trends in educational information and instructional technologies will also be covered. Emphasis will be placed on planning for and integration of these technologies into educational settings. Differentiated assignments for Doctoral students. Prerequisites: RSCH 6101 or RSCH 6110/8110 *(On Demand)*

EIST 6491. Internship and Seminar in Instructional Systems Technology Part I. (3) Application of knowledge and skill in instructional systems technology in a cooperating setting on or off campus; also includes a seminar. *(Fall, Spring, Summer)*

EIST 6492. Internship and Seminar in Instructional Systems Technology Part II. (3) Prerequisite: EIST 6491. Continued application of knowledge and skills in instructional systems technology in a cooperating setting on or off campus; also includes a seminar. *(Fall, Spring, Summer)*

EIST 6800. Individual Study in Instructional Systems Technology. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. Differentiated assignments for Doctoral students. *(Fall, Spring, Summer)*

EIST 7999. Graduate Residence. (1) Meet Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. *(Fall, Spring, Summer)*

EIST 8000. Topics in Instructional Systems Technology. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit in different topics. *(Fall, Spring, Summer)*

EIST 8100. Reading in Instructional Systems Technology. (3) Contemporary issues and trends in instructional systems technology, including foundations in learning research, instructional systems design, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization. Differentiated assignments for Doctoral students. *(Fall)*

EIST 8101. The Adult Learner. (3) The focus of this course will be on the examination of how adults learn in instructional settings. Characteristics of the adult learner will be examined. Students will investigate adult learning theory as well as current trends and advancements in adult learning. The focus will be on making better instructional decisions and media selection for the education and training of adults. . Differentiated assignments for Doctoral students. *(Fall, Summer)*

EIST 8102. Readings in Research in Instructional Systems Technology. (3) Current issues and trends in instructional systems technology research including instructional systems design, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization. Differentiated assignments for Doctoral students. *(On Demand)*

EIST 8120. Current Trends in Instructional Systems Technology. (3) The focus of this course will be on the examination current and future trends in Instructional Systems Technology and Human Performance Consulting. Students will examine the most current literature in the filed. Students will examine the instructional technology professional organization trends and recommendations. Differentiated assignments for Doctoral students. *(On Demand)*

EIST 8121. Advanced Instructional Design. (3) Advanced instructional design techniques; systems development; task analysis; sequencing and delivery systems. *(On Demand)*

EIST 8150. Systemic Design of Educational Systems. (3) Concepts and principles of the systemic analysis and design of educational systems will be covered. Emphasis will be given to the analysis of educational systems and the educational/societal trends that impact the systemic design of educational systems. Differentiated assignments for Doctoral students. Prerequisites: RSCH 6101 or RSCH 6110/8110 *(On Demand)*

EIST 8160. Design of Educational Information Systems. (3) Fundamentals of and planning for educational data systems will be covered. Topics covered will include networking technologies, Internet technologies, firewall technologies, distance education systems, and Information Systems models. Current and future trends in educational information and instructional technologies will also be covered. Emphasis will be placed on planning for and integration of these technologies into educational settings. Differentiated assignments for Doctoral students. Prerequisites: RSCH 6101 or RSCH 6110/8110 *(On Demand)*

EIST 8800. Individual Study in Instructional Systems Technology. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. Differentiated assignments for Doctoral students. *(Fall, Spring, Summer)*

MIDDLE GRADES EDUCATION AND SECONDARY EDUCATION

Department of Middle Grades, Secondary, and K-12 Education

324 College of Education Building
704-687-8875
http://education.uncc.edu/mdsk

Degree

M.Ed.

Coordinator

Dr. Warren J. DiBiase

Graduate Faculty

Lynn Bailey, Assistant Professor
Lilian Brannon, Professor
Leslie Cook, Assistant Professor
Lan Quach, Assistant Professor
Warren DiBiase, Associate Professor
Kimberly Hartman, Assistant Professor
Tina Heafner, Assistant Professor
Charles Hutchison, Assistant Professor
Jeanneine P. Jones, Professor

Theresa Perez, Professor
David Pugalee, Associate Professor

MASTER OF EDUCATION IN MIDDLE AND SECONDARY GRADES

The Master of Education in Middle and Secondary Grades has been developed specifically for experienced teachers in middle and secondary schools who desire advanced study in content and pedagogy, and seek an opportunity to integrate advanced study with their teaching experiences. In addition, candidates will acquire the skills, knowledge and abilities required to assume a leadership role. For example, candidates are required to take Teacher Leadership in their final semester, a course that will better prepare them to become content department chairs, interdisciplinary team leaders, or staff development specialists. Furthermore, by admitting only experienced teachers, candidates will serve as resources for one another and become active members in a community of professionals who are knowledgeable, reflective, responsive, and effective practitioners. Finally, because this degree focuses on a teacher's professional growth, it requires completion of a research project.

Program Goals

Successful graduates will possess a comprehensive pedagogical, conceptual, and reflective knowledge base that can be applied to their classrooms through effective instruction, responsivity and collaboration. This developed and applied knowledge will be, in turn, shared with other professionals through a variety of leadership opportunities. Both the College's Conceptual Framework and the following goals provide structure for the entire program:

Program graduates will be able to:

1) Self-direct their personal and professional growth;
2) Respond effectively to adolescent differences, equity and diversity;
3) Demonstrate advanced pedagogical content knowledge of the curriculum;
4) Improve educational practice through critical self-reflection, self-assessment, and applied research;
5) Work collaboratively with colleagues, professionals, parents, guardians, families and individuals charged with the well being of learners; and
6) Assume a leadership role at the local, district, regional, state, or national level.

Admission Requirements

1) A Bachelor's degree from an accredited college or university
2) A North Carolina "A" license in Middle Grades or Secondary Education, or the equivalent from another state in both the track and content field of the program the candidate is making application to.
3) Teaching experience in a middle grades or secondary classroom
4) An undergraduate GPA of 2.75 overall and 3.0 in the junior/senior years
5) An acceptable score on the GRE or MAT
6) A written narrative providing a statement of purpose for Master's degree study
7) Satisfactory recommendations from three professional educators

Degree Requirements

This degree requires a total of 39 hours of coursework in either middle grades or secondary education. Candidates must fulfill requirements in one of these two tracks.

Tracks

There are two tracks within this degree. One focuses on middle grades education and the other on secondary education. Each requires a total of 39 hours as prescribed by program requirements.

Core Courses

There are five core courses required that are common to both the middle grades and secondary tracks. These include:

RSCH6101	Educational Research Methods (3)
MDSK6356	Curriculum Studies (3)
MDSK6150	Models of Teaching (3)
MDSK6260	Principles of Teacher Leadership (3)
MDSK6691	Seminar in Professional Development (3)

Electives

Each track allows one three-hour elective.

Capstone Experience

Candidates in both middle grades and secondary must complete a capstone experience. They may choose from either a comprehensive portfolio or research project.

Advising

Each candidate will have an assigned advisor within the Department of Middle Grades, Secondary, and K-12 Education. Candidates will have access to a second advisor in their area of content specialization through the College of Arts and Sciences.

Licensure

Graduates with two or more years of teaching experience will receive an Advanced Competency "M" license from the state of North Carolina in addition to their Master's Degree.

Qualifying Examination

Acceptable scores on either the GRE or MAT.

Committees

Candidates will convene a committee of three graduate faculty members whom they will select with assistance

from their Department advisor. The primary role of this committee is to assess the students' research project.

Research Opportunities and Experiences

There are many opportunities for candidates to participate in research studies on either an independent or collaborative basis. These opportunities are available with Department faculty members, through assigned course work, and through the research project.

Assistantships

There are limited opportunities available within the Department of Middle Grades, Secondary, or K-12 Education. Contact the Department at 704-687-8875 for more information.

Program Certifications/Accreditation

Programs are accredited by both NCATE and NCDPI.

Middle Grades Education

Degree Requirements

Total of 39 hours

Core Courses:

- RSCH6101 Educational Research Methods (3)
- MDSK6356 Curriculum Studies (3)
- MDSK6150 Models of Teaching (3)
- MDSK6260 Teacher Leadership (3)
- MDSK6691 Seminar in Professional Development (3)

Middle Grades:

- MDSK6220 Adolescence and Learning (3)
- MDLG6225 Issues in Middle Grades Education (3)

Methods Course: Choose one from your content concentration (3)

- MDSK6351 Advanced Methods in Middle and Secondary Science (3)
- MAED5040 Topics in Mathematics Education: Intermediate (3)
- ENGL6274 Contexts and Issues in the Teaching of English (3)
- MDSK6354 Advanced Methods in Middle and Secondary Social Studies (3)

Content Specialization Requirements: 12 hours
The content field of study may be chosen from one of the following areas:

- Science
- Social Studies
- Mathematics
- English

Professional Elective: 3 hours
Graduate-level electives should be chosen in consultation with student's advisor. Other departments offer appropriate electives. Possible elective options include, but are not limited to, the following:

- EDUC6102 Person and School in Urban Society (3)
- EIST6110 Instructional Design (3)
- RSCH6109 Assessment and Evaluation Methods (3)
- RSCH6110 Descriptive and Inferential Statistics in Education (3)
- TESL5101 Second Language Diagnosis and Evaluation (3)
- TESL5103 Teaching English as a Second Language (3)
- EDUC7126 Comparative Education (3)
- MDSK6250 Issues in 6-12 Science Education (3)
- MDSK6251 Issues in 6-12 Math Education (3)
- MDSK6254 Issues in 6-12 Social Studies Education (3)
- MDLG6800 Individual Study in Middle Grades Education (1-6)

Secondary Education

Degree Requirements

Total of 39 hours

Core Courses:

- RSCH6101 Educational Research Methods (3)
- MDSK6356 Curriculum Studies (3)
- MDSK6150 Models of Teaching (3)
- MDSK6260 Teacher Leadership (3)
- MDSK6691 Seminar in Professional Development (3)

Methods Course: Choose one from your content concentration (3)

- MDSK6351 Advanced Methods in Middle and Secondary Science (3)
- MDSK6354 Advanced Methods in Middle and Secondary Social Studies (3)

Content Specialization Requirements: 18 hours
The content field of study may be chosen from one of the following areas:

- Science
- Social Studies

Note- *Masters degrees in mathematics and English education are offered through the mathematics and English departments respectively.*

Professional Elective: 3 hours
Graduate-level electives should be chosen in consultation with student's advisor. Other departments offer appropriate electives. Possible elective options include, but are not limited to, the following:

- EDUC6102 Person and School in Urban Society (3)
- EIST6110 Instructional Design (3)
- RSCH6109 Assessment and Evaluation Methods (3)

RSCH6110	Descriptive and Inferential Statistics in Education (3)
TESL5101	Second Language Diagnosis and Evaluation (3)
TESL5103	Teaching English as a Second Language (3)
EDUC7126	Comparative Education (3)
MDSK6250	Issues in 6-12 Science Education (3)
MDSK6251	Issues in 6-12 Math Education (3)
MDSK6254	Issues in 6-12 Social Studies Education (3)
SECD6800	Individual Study in Secondary Education (1-6)

Courses in Middle Grades Education and Secondary Education

Core Courses

MDSK 6150. Models of Teaching. (3) Learning theory associated with information processing, personal, social, and behavioral models; current trends in instructional methodology for a variety of content areas. *(Spring)*

MDSK 6260: Teacher Leadership. (3) An examination of the current research on adult learning and development, expert knowledge, and the professionalization of the field of teaching. Students develop skills to direct other educational professionals. *(Fall, Spring) (Evening)*

MDSK 6356. Curriculum Studies. (3) Examination of the field of curriculum study with particular emphasis on the change process. *(Fall)*

MDSK 6691. Seminar in Professional Development (3). Seminar focused on the self-direction and professional development of teachers. Emphasis will be placed on the design, development, and completion of the candidate's comprehensive portfolio, thesis, or research project. *(Fall, Spring) (Evening)*

Middle Grades Education:

MDSK 6220. Adolescence and Learning. (3) Study of adolescence as a phase of development and its relationship to the learning process. *(Fall) (Evening)*

MDLG 6225. Issues in Middle Grades Education. (3) Examination of educational practices in the middle grades (6-9) including trends and issues unique to that philosophy. Emphasis on broadening understanding of foundational components, organizational patterns, instructional programs and management techniques. *(Spring) (Evening)*

MDLG 6800. Individual Study in Middle Grades Education. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

Advanced Graduate Only

MDLG 7999. Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. *(Fall, Spring)*

Secondary Education:

SECD 6800. Individual Study in Secondary Education. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

Advanced Graduate Only

SECD 7999. Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. *(Fall, Spring)*

Methods Courses:

MDSK 6351. Advanced Methods in Middle and Secondary Science. (3) Examination of current research and scholarship on the teaching of science in middle and secondary schools. Particular emphasis on the development of advanced instructional expertise and leadership. *(On demand)*

MDSK 6354. Advanced Methods in Middle and Secondary Social Studies. (3) Examination of current research and scholarship on the teaching of social studies in middle and secondary schools. Particular emphasis on the development of advanced instructional expertise and leadership. *(On demand)*

Examples of Possible Electives:

MDSK 6250. Issues in 6-12 Science Education. (3) Orientation to content, curriculum and methods appropriate for teaching science. Emphasis is on a critical examination of current trends and practices in the teaching of science. *(On demand)*

MDSK 6251. Issues in 6-12 Mathematics Education. (3) Orientation to content, curriculum and methods appropriate for teaching mathematics. Emphasis is on critical examination of current trends and practices in the teaching of mathematics. *(On demand)*

MDSK 6254. Issues in 6-12 Social Studies Education. (3) Current issues in teaching and learning social studies. Emphasis on current trends in curriculum, advanced instructional methods, and research. *(On demand)*

READING EDUCATION

Department of Reading and Elementary Education

367 College of Education Building
704-687-8889
http://education.uncc.edu/reel/

Degree

M.Ed.

Coordinator

Dr. Karen Wood

Graduate Faculty

Patricia Douville, Assistant Professor
Barbara A. Edwards, Associate Professor
Janet A. Finke, Associate Professor
Mary Beth Marr, Clinical Assistant Professor
Maryann Mraz, Assistant Professor
Robert J. Rickelman, Professor
D. Bruce Taylor, Assistant Professor
Karen D. Wood, Professor

MASTER OF EDUCATION IN READING EDUCATION

Designed for experienced teachers, the M.Ed. Program in Reading Education qualifies graduates for the new Masters/Advanced Competencies "M" license in K-12 reading education. Relevant to all areas of the K-12 curriculum, this program is designed for classroom teachers and aspiring literacy specialists who are interested in improving instructional programs and practices that promote literacy among all learners.

Program Objectives

Based on professional standards published by the International Reading Association, the program prepares graduates to assume the role of a reading professional who: (1) provides specialized K-12 literacy instruction and assessment in cooperation with other professionals to students in schools, reading resource centers, or clinics, (2) works cooperatively and collaboratively with other professionals in planning classroom and school wide programs to meet the needs of a diverse population of learners, (3) serves as a resource in the area of literacy education for teachers, administrators, and the community, and (4) provides leadership in literacy instruction through mentoring and staff development.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, applicants must hold an A level license in any teaching field from the North Carolina Department of Public Instruction (or its equivalent from another state).

Degree Requirements

The M.Ed. Program in Reading, Language, and Literacy Education requires a total of 39 hours of courses to be taken in three sequenced phases: Developing Plans and Perspectives (13 hours), Expanding Content and Pedagogical Knowledge (13 hours), Influencing Literacy Instruction (7 hours), plus 6 hours of electives.

Phase I: Developing Plans and Perspectives (13 hours)

READ6100	Current Issues and Practices in Literacy (3)
READ6252	K-12 Writing Development and Instruction (3)
READ6691A	Seminar in Professional Development (1)
RSCH6101	Introduction to Educational Research (3)
ENGL6103	Juvenile Literature (3) OR
ENGL5104	Multiculturalism & Children's Literature (3) Or alternative courses with similar content and approved by advisor

Phase II: Expanding Content and Pedagogical Knowledge (13 hours)

EDUC6254	Teaching Diverse Learners (3)
RSCH7111	Qualitative Research Methods in Education (3) or alternate graduate level research course approved by advisor
READ6250	Emergent and Elementary Literacy (3)
READ6255	Middle/Secondary Reading and Writing (3)
READ6691B	Seminar in Professional Development (1)

Phase III: Influencing Literacy Instruction (7 hours)

READ6260	Diagnostic Assessment and Instruction in Reading (3)
READ6474	Collaborative Leadership in Literacy Education (3)
READ6691C	Seminar in Professional Development (1)

Elective Courses (6 hours)

Courses may be selected from the following categories and must be approved by the student's advisor: Pedagogy, Research, Diversity, Resources, and Leadership.

Capstone Experience

Students have the choice of a Master's Research Project or a Master's Comprehensive Portfolio, which is aligned with requirements of the National Board for Professional Teaching Standards. The final document will be presented to graduate students and faculty during READ 6691 C: Seminar in Professional Development. A committee of

graduate faculty using the department's scoring rubric will evaluate both the presentation and the document.

Assistantships

The Department has a limited number of Graduate Assistantships. Typical Stipends range from $5,600 to $7,000 for the academic year. Applications are available from the Department of Reading and Elementary Education, 704-687-8889.

Courses in Reading Education

READ 6000. Topics in Reading, Language, and Literacy. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

READ 6100. Current Issues and Practices in Literacy Education. (3) Theories, research, and instructional methods associated with reading and language arts, preschool through high school; questions of effectiveness related to instructional approaches and materials; related topics such as multicultural literacy, the role of phonics, and assessment. *(Fall) (Evenings)*

READ 6250. Emergent and Elementary Literacy. (3) Prerequisite: Completion of Phase I. Critical reading and use of the literature in literacy education, examination of literacy content taught in the K-6 curriculum with an emphasis on pre-K and beginning reading instruction research, theory and practice, multiple models and approaches for teaching and assessing learning in literacy development, required action research project. *(Fall) (Evenings)*

READ 6252. K-12 Writing Development and Instruction. (3) Prerequisite: Completion of Phase I. or do we want to consider putting this in phase II so we have 3 read courses per phase Theories, research, and critical issues related to students' writing development and effective writing instruction. Field experience required. *(Spring, Summer) (Evenings)*

READ 6255. Middle/Secondary Reading and Writing. (3) Prerequisite: Completion of Phase I. Theories, research, and instructional methods associated with reading and writing in the content areas, with a special emphasis on grades 6-12. Field experience and action research project are required. *(Spring) (Evenings)*

READ 6260. Diagnostic Assessment and Instruction in Reading. (3) Prerequisite: Completion of Phase II. Examination, uses, and critique of theories and research about literacy processes and problems; diagnosis and correction of reading disabilities; instructional strategies and action research designed to improve reading proficiency. *(Fall) (Evenings)*

READ 6474. Collaborative Leadership in Literacy Education. (3) Prerequisites: Completion of Phase II and READ 6260 course. Investigates models and strategies for assuming the leadership responsibilities of a literacy specialist, including mentoring, staff development, school-wide literacy program development and assessment, supporting the action research of teachers, and developing partnerships with parents and community volunteers. *(Spring) (Evenings)*

READ 6691. Seminar in Professional Development. (3) Prerequisites: None for READ 6691A; completion of Phase I for READ 6691B; completion of READ 6260 for READ 6691C. Seminar focused on the self-direction and professional development of literacy specialists, with an increasing emphasis on becoming instructional leaders, as students plan to meet their own learning needs in instructional expertise; expand their awareness of the role of the literacy specialist; design, develop, and present their basic program portfolio and their Master's Research Project or Comprehensive Portfolio. (Taken for one credit in Phase I [READ 6691A]; one in Phase II (READ 6691B) and one in Phase III [READ 6691C] for a total of three credits.) *(Fall, Spring) (Evenings)*

READ 6800. Individual Study in Reading, Language, and Literacy. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

Advanced Graduate ONLY
READ 7999. Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive exam. *(Fall, Spring, Summer)*

SPECIAL EDUCATION

Department of Special Education and Child Development

New Education Building 348
704-687-8772
http://www.uncc.edu/colleges/education/spcd/main.htm

Degrees

Ph.D.
M.Ed. (for licensed teachers)
M.A.T. (for individuals with a bachelor's degree who are seeking initial licensure in special education and a master's degree)
Fast-tracks (for individuals with a bachelor's degree who are seeking initial licensure in special education)
Graduate Certificates (Academically or Intellectually Gifted, Supported Employment and Transition)

Coordinator for M.Ed., M.A.T., Fast-track, and Certificate Programs

Dr. Gloria Campbell-Whatley
(gcampbe1@email.uncc.edu)

Graduate Faculty

Kelly Anderson, Assistant Professor
Bob Algozzine, Professor
Janet Baxter, Clinical Assistant Professor
John Beattie, Assistant Professor
Gloria Campbell-Whatley, Associate Professor
Diane Browder, Distinguished Professor
Mary Lynne Calhoun, Professor, Dean, College of Education
Nancy Cooke, Associate Professor
Shelagh Gallagher, Assistant Professor
Susan Gibbs, Clinical Assistant Professor
LuAnn Jordan, Assistant Professor
Ya Yu Lo, Assistant Professor
Peggy Moore, Lecturer
Brenda Romanoff, Associate Professor
JaneDiane Smith, Assistant Professor
Fred Spooner, Professor
David Test, Professor
Richard White, Professor, Chair, Department of Special Education and Child Development
Wendy Wood, Assistant Professor
Cheryl Young, Assistant Professor

Ph.D. IN SPECIAL EDUCATION

Department of Special Education and Child Development

New Education Building 348
704-687-8772
www.uncc.edu/spedphd

Degree

Ph. D.

Coordinator for Ph.D. Program

Dr. Diane Browder (Dbrowder@email.uncc.edu)

Program of Study

The doctoral program at UNC Charlotte prepares special educators as innovators, teachers, leaders, and researchers whose work contributes to enhancing the quality of life of individuals who are exceptional learners and their families. This program offers graduates the widest array of career options and provides the solid research foundation needed for the rapidly changing field of special education. Potential employment for program graduates includes leadership positions in schools and agencies and faculty positions in higher education as teacher trainers/ researchers.

The program requires 59 credits beyond the master's degree and builds on the Master of Education in Special Education or a comparable program. These hours include 15 credits in doctoral seminars in special education, 14 credits in research and practice (field work and writing courses), 15 credits in research, 15 credits of an individually designed specialty, and a dissertation. Additional coursework may be required for students who do not have a Master's degree or licensure in Special Education; whose master's program was not comparable to UNC Charlotte's; or whose Master's coursework is outdated.

The program will accept up to two courses as transfer from a regionally accredited doctoral granting institution, providing the Special Education Doctoral Committee determines that the course or courses to be transferred are equivalent to similar courses required in the UNC Charlotte Special Education Ph.D. program or fit the specialty area. The grade in these transfer courses must be an A or B. Transfer credits cannot replace the four core doctoral seminars in special education and all of the dissertation work must be completed at UNC Charlotte.

Timelines

Students are admitted for either fulltime study or intensive part-time study. Students must complete their degree, including the dissertation, within 8 years. The minimum time for completion for a fulltime student is 3 years. Fulltime students must meet benchmark requirements each year to maintain their status as a doctoral student. Part-time students also must meet benchmark requirements that occur approximately every two years. These benchmarks are intended to help students achieve their goal of completing the doctorate in a timely manner.

Additional Admission Requirements

Applications for admission will be accepted once a year to begin doctoral studies in the fall semester and must be submitted to the Graduate Admissions Office by December 15th.
The following documents must be submitted with the application:

1) Two official transcripts of all academic work attempted since high school indicating a GPA of 3.5 (on a scale of 4.0) in a graduate degree program.*
2) Official report of score on the GRE or MAT that is no more than 5 years old.*
3) At least three references* of someone who knows the applicant's current work and/ or academic achievements in previous degree work.
4) A two page essay describing prior experiences with individuals with exceptionalities and objectives for pursuing doctoral studies.*
5) A current resume or vita.
6) A professional writing sample (e.g., published article, manuscript submitted for publication, term paper submitted in prior coursework, abstract of thesis, teaching manual).

7) Documentation of teaching and other field experience (e.g., copy of teaching evaluation or letter recommendation from supervisor.)
8) An interview with the program faculty.
9) International students must submit official test scores on the Test of English as a Foreign Language (TOEFL) of at least 557 on the written test or 220 on the computer-based test or a score of at least 78% on the Michigan English Language Assessment Battery (MELAB). All tests bust have been taken within the past two years.*

**These items are required of applicants to any of UNC Charlotte' s doctoral programs.*

Degree Requirements

Doctoral Seminars in Special Education (15 credits)

SPED8671	Doctoral Seminar in Research in Special Education (3)
SPED8672	Doctoral Seminar in Leadership in Special Education (3)
SPED8673	Doctoral Seminar in Innovation in Special Education (3)
SPED8674	Doctoral Seminar in Teaching in Special Education (3)
SPED8699	Dissertation Seminar (3)

Research and Practice in Special Education (11 credits)

Note: The following courses are used in the development of portfolios I and II.

SPED8471	Professional Writing (2) (Take concurrent with SPED 8671)
SPED8472	Research Implementation (2) (Take concurrent with SPED 8271)
SPED8473	Grant Writing (2) (Take concurrent with SPED 8673)
SPED8474	Supervision of Student Teachers (5) (Take concurrent with SPED 8674)

One of these:

SPED8475	College Teaching (3) (Take after coteaching at least one course) OR
SPED8476	Internship (3) (Take anytime after completion of first 24 credits; May be in higher education, government, agency, school district)

Research (15 credits + Doctoral Seminar in Research & Dissertation Seminar)

RSCH8110	Descriptive and Inferential Statistics (3)
RSCH8120	Advanced Statistics (3)
RSCH8113	Single-Case Research (3)

Select 2 of the following:

RSCH6130	Presentation and Computer Analysis of Educational Data (3)
RSCH8140	Multivariate Statistics (3)
RSCH8211	Qualitative Research Methods in Education (3)
RSCH8212	Survey Research Methods in Education (3)
RSCH8296	Program Evaluation Research Methods in Education (3)

Specialty (15 credits)

An individually designed specialty of graduate courses developed by student and advisor and approved by the Special Education Doctoral Committee. This specialty will typically be related to the student's major area of expertise (e.g., BED, LD, MD, SP, EC, Gifted, Transition), but students are encouraged to consider coursework in general education or other disciplines (e.g., taking Ed. Leadership coursework to get the 113 Certification Curriculum Instruction Specialist Certificate). It is strongly recommended that this specialty include:

Coteaching in one or more licensure or other courses related to student's specialty
One or more SPED 8670: Advanced Research Topics in Special Education

Additional Degree Requirements

In addition to coursework and the dissertation, students complete a portfolio of achievements related to the four focus areas- leadership, innovation, teaching, and research. This portfolio must receive satisfactory ratings from the Portfolio Review Committee at two critical junctures known as Benchmark One and, Two. The first benchmark serves as a Qualifying Examination and includes demonstration of writing, teaching, and research skills. The second benchmark is comparable to the comprehensive exams required by some Ph.D. programs in Special Education and includes the development of a grant. Students receive opportunities to build this portfolio through the Research and Practice coursework. The following are some of the products in the portfolio: research based paper, journal review, conference presentation, personal leadership plan, grant proposal, quality enhancement plan, and research report.

Admission to Candidacy

Once the student has an approved dissertation proposal, an application for candidacy should be submitted first to the advisor, then to the portfolio committee, and the Doctoral Coordinator. The application for candidacy must be submitted at least 4 weeks before the semester in which the student graduates. In the Special Education program, it is recommended that this application be made as soon as the proposal has been approved.

Dissertation Requirements

The purpose of the dissertation is for doctoral students to demonstrate their ability to synthesize the professional literature and generate new knowledge for the profession through using well-established research tools. For the Ph.D. in Special Education, the dissertation may be quantitative (group or single subject) or qualitative research. Whatever type of design, it must adhere to current standards for quality as reflected in professional

writing on the chosen method of research design and reflected in the current literature. Students must be continuously enrolled for dissertation research credits through the semester of graduation. Defense of the dissertation is conducted in a final oral examination that is open to the university community.

Application for Degree

Students must submit an Application for Degree during the semester in which they successfully defend their dissertation proposal. Adherence to Graduate School deadlines is expected. Degree requirements are completed when students successfully defend their dissertation and file the final copy of the dissertation in the Graduate School.

MASTER OF EDUCATION IN SPECIAL EDUCATION

For the M.Ed. in Special Education, an "A" level license in special education from the North Carolina Department of Public Instruction (or its equivalent from another state) is required. For the M.Ed. in Academically or Intellectually Gifted, an "A" level license in an elementary, middle, or secondary education teaching field is required.

Program of Study

The mission of the Special Education (SPED) program is to "develop excellent professionals" for educational roles in public and private educational agencies and nonprofit agencies. The 39-hour M.Ed. in Special Education is organized around five major goals. These goals and related experiences are designed to help teachers become data-based decision makers. We believe that master teachers are self-reflective, lifelong learners who have an advanced understanding of child development, content, and pedagogy; and who use research, experience, and professional judgment to lead others in collaborative planning, implementation, and evaluation of effective instruction for students with disabilities. The program is responsive to expectations set forth by NCATE (National Council for the Accreditation of Teacher Education), NCDPI (North Carolina Department of Public Instruction), NBPTS (National Board of Professional Teacher Standards), CEC (Council for Exceptional Children), and the 1997 NC Excellent Schools Act. By focusing on "best practices" in special education and teacher education, the SPED program has established a model program that continuously achieves regional, state, and national recognition in scholarship, teaching, and research.

Additional Admission Requirements

1) Official transcripts of all previous academic work attempted beyond high school documenting undergraduate GPA of 2.75 overall and 3.0 in jr./sr. years.
2) Official agency reports of satisfactory GRE or MAT test scores (30th percentile or above).
3) At least three evaluations from professional educators familiar with the applicant's personal and professional qualifications.
4) A one or two page essay describing the applicant's experience and objective in undertaking graduate study.

Degree Requirements

M.Ed. in Special Education

Phase I: Developing Perspective (10 hours)

RSCH6101	Educational Research Methods (3)
EDUC6254	Individualizing Instruction for Diverse Learners (3)
ADMN6106	Legal Issues in Special Education (3)
SPED6691	Seminar in Professional and Leadership Development (1)

Phase II: Content and Pedagogy (10 hours)

RSCH7113	Single-Case Research (3)
SPED6502	Advanced Classroom Management (3)
SPED6503	Instructional Design in Special Education (3)
SPED6691	Seminar in Professional and Leadership Development (1)

Electives (15 hours)

Phase III: Collaborative Leadership (4 hours)

SPED6690	Consultation and Collaboration (3)
SPED6691	Seminar in Professional and Leadership Development (1)

M.Ed. in Academically or Intellectually Gifted

Phase I: Developing Perspective (7 hours)

RSCH6101	Educational Research Methods (3)
SPED5211	Nature and Needs of Gifted Students (3)
SPED6691	Seminar in Professional and Leadership Development (1)

Phase II: Content and Pedagogy (25 hours)

SPED6000	Topics in Special Education: AIG (3)
SPED6124	Methods of Instructing Gifted Students (3)
SPED6161	Social and Emotional Needs of Gifted Students (3)
SPED6224	Adapting Curriculum Materials and Classroom Differentiation (3)
SPED6241	Constructing Curriculum for Gifted Students (3)
SPED6270	Planning and Evaluation of Gifted Programs (3)
SPED6271	Leadership in Gifted Education (3)

SPED6691 Seminar in Professional and Leadership Development (1)
RSCH7111 Qualitative Methods (3)

Electives (3 hours)

Phase III: Collaborative Leadership (4 hours)
SPED6690 Consultation and Collaboration (3)
SPED6691 Seminar in Professional and Leadership Development (1)

Admission to Candidacy Requirements
Apply the semester prior to planned graduation. Full-time students must have completed 19 hours and be enrolled for at least an additional 10 hours. Part-time students must have completed at least 31 hours.

Assistantships
The Program typically has a limited number of graduate assistantships with salaries starting at $8,000/ academic year. Applications are available from the Department of Counseling, Special Education, and Child Development (704-687-8772).

Internships
Neither the M.Ed. in Special Education nor the M.Ed. in Academically and Intellectually Gifted requires an internship.

Practica
Most courses require students to apply the knowledge learned in classes to public/private school classrooms.

Capstone Experiences
The capstone experience will be fulfilled by completing either a Master's Research Project (recommended) or a Comprehensive Portfolio (with approval of advisor).

Electives
The M.Ed. in Special Education includes 15 elective hours. This will enable students to add-on an additional North Carolina teaching license in a disability area (i.e., behavioral-emotional disabilities, cross-categorical, learning disabilities, mental disabilities, severe and profound disabilities), complete the Graduate Certificate in Supported Employment and Transition, or complete an individualized set of courses developed as a result of participating in the first SPED 6691 seminar or from discussing possibilities with their advisor. Students in the M.Ed. in Academically and Intellectually Gifted program have 3 elective hours.

Advising
Upon acceptance into the program all students are assigned an advisor. Students are expected to meet with their advisor each semester to discuss their coursework.

Licensure
Successful completion will lead to a North Carolina masters/advanced competencies license.

Committees
Each student will have a committee of two graduate faculty members who will provide guidance through the Capstone Experience. The committee will include the student's advisor, as well as one additional graduate faculty member chosen by the student.

Application for Degree
Apply the semester prior to planned graduation. Full-time students must have completed 19 hours and be enrolled for at least an additional 10 hours. Part-time students must have completed at least 31 hours.

Research Opportunities/Experiences
The Special Education faculty continuously achieves regional, state, and national recognition in scholarship, teaching, and research. As a result students will have multiple opportunities to become involved in practical, classroom-based research. In addition "action-research" projects are required in a variety of courses.

Tuition Waivers
A person qualifies for in-state tuition if he/she; is paid on the teacher salary schedule, has established legal residence in North Carolina, is employed full-time by a North Carolina public school, but only for "courses relevant to teacher certification or to professional development as a teacher." Contact the Graduate School for details.

Financial Aid/ Financial Assistance
Information is available from the Teacher Education Advising and Licensure Office located in suite 119 New College of Education Building (704- 687-8725).

Program Certifications/Accreditation
Both the Special Education M.Ed. Program and the Academically and Intellectually Gifted M.Ed. Program are fully accredited by NCATE, CEC, and NCDPI.

M.A.T. – SPECIAL EDUCATION

The Master of Arts in Teaching M.A.T. program is designed for individuals with a bachelor's degree who are seeking initial licensure in special education (either General Curriculum or Adapted Curriculum) and a master's degree. For more information on the MAT, please visit our website at http://www.uncc.edu/education/mat.

Program of Study
The mission of the Special Education (SPED) program is to "develop excellent professionals" for educational roles in public and private educational agencies and nonprofit

agencies. The 39-hour M.A.T. in Special Education is organized around five major goals. These goals and related experiences are designed to help teachers become data-based decision makers. We believe that master teachers are self-reflective, lifelong learners who have an advanced understanding of child development, content, and pedagogy; and who use research, experience, and professional judgment to lead others in collaborative planning, implementation, and evaluation of effective instruction for students with disabilities. The program is responsive to expectations set forth by NCATE (National Council for the Accreditation of Teacher Education), NCDPI (North Carolina Department of Public Instruction), NBPTS (National Board of Professional Teacher Standards), CEC (Council for Exceptional Children), and the 1997 NC Excellent Schools Act. By focusing on "best practices" in special education and teacher education, the SPED program has established a model program that continuously achieves regional, state, and national recognition in scholarship, teaching, and research.

Additional Admission Requirements

1) Official transcripts of all previous academic work attempted beyond high school documenting undergraduate GPA of 2.75 overall and 3.0 in jr./sr. years.
2) Official agency reports of satisfactory GRE or MAT test scores (30th percentile or above).
3) At least three evaluations from professional educators familiar with the applicant's personal and professional qualifications.
4) A one or two page essay describing the applicant's experience and objective in undertaking graduate study.

Degree Requirements

M.A.T. in Special Education (Initial Licensure in Special Education: General Curriculum)

General Curriculum, Option A: Teachers with a non-special education license

Phase I (18 hours)
Take all of these courses first; they are required prerequisites for the courses below.

SPED5173 Diagnostic Assessment (3)
OR
SPED5270 Classroom Management (3)
SPED5175 Instructional Planning in Special Education (3)

Take these courses next.

SPED5272 Teaching Mathematics to Students with Special Needs (3)
SPED5275 Teaching Reading to Students with Special Needs (3)
SPED5277 Teaching Writing to Students with Special Needs (3)
SPED6475 Internship: General Curriculum (3)

Praxis II Specialty Area exams passed
Phase I completion form signed by advisor and filed with TEAL Office
Application for "A" license filed in TEAL office

Phase II (21 Hours)
Take these courses first

EDUC6254 Individualizing Instruction for Diverse Learners (3)
RSCH7113 Single Case Research

Take these courses next

RSCH6101 Educational Research Methods (3)
SPED6691 Seminar in Professional and Leadership Development

Followed by these courses

SPED6502 Advanced Classroom Management (3)
SPED6503 Instructional Design in Special Education (3)
SPED6691 Seminar in Professional and Leadership Development (1)

Take these courses last

SPED6690 Consultation and Collaboration (3)
SPED6691 Seminar in Professional and Leadership Development (1)

General Curriculum, Option B: Teachers with a provisional (lateral entry) license or emergency license and students without a license.

Phase I (27 hours)
Take all of these courses first; they are required prerequisites for the courses below.

SPED5100 Introduction to Special Education (3)
SPED5173 Diagnostic Assessment (3)
SPED5175 Instructional Planning in Special Education (3)
SPED5270 Classroom Management (3)

Take these courses next.

SPED5272 Teaching Mathematics to Students with Special Needs (3)
SPED5275 Teaching Reading to Students with Special Needs (3)
SPED5277 Teaching Writing to Students with Special Needs (3)
SPED6690 Consultation and Collaboration (3)
SPED6475 Internship: General Curriculum (3)

*EIST 5100 completed (ONLY for students without a license)
Praxis II Specialty Area exams passed
Phase I completion form signed by advisor and filed with TEAL Office
Application for "A" license filed in TEAL office

Phase II (12 Hours)
Take these courses first
RSCH7113 Single Case Research (3)
SPED6691 Seminar in Professional and Leadership Development (1)
Take these courses next
RSCH6101 Educational Research Methods (3)
SPED6691 Seminar in Professional and Leadership Development (1)
Take these classes last
SPED6502 Advanced Classroom Management (3)
OR
SPED6503 Instructional Design in Special Education (3)

SPED6691 Seminar in Professional and Leadership Development (1)

M.A.T. in Special Education (Initial Licensure in Special Education: Adapted Curriculum)

Adapted Curriculum, Option A: Teachers with a non-special education license

Phase I (21 hours)
Take all of these courses first; they are required prerequisites for the courses below.
SPED5270 Classroom Management (3)
SPED5175 Instructional Planning in Special Education (3)
SPED5273 Life Skills (3)
Take these courses next
SPED5274 General Curriculum Access and Adaptations (3)
SPED5278 Systematic Instruction in the Adapted Curriculum (3)
SPED5316 Transition Planning & Service Delivery (3)
SPED6476 Internship: Adapted Curriculum (3)

Praxis II Specialty Area exams passed
Phase I completion form signed by advisor and filed with TEAL Office
Application for "A" license filed in TEAL office

Phase II (18 Hours)
Take these courses first
EDUC6254 Individualizing Instruction for Diverse Learners (3)
RSCH7113 Single Case Research (3)
Take these courses next
RSCH6101 Educational Research Methods (3)
SPED6691 Seminar in Professional and Leadership Development (1)
Followed by these courses
SPED6502 Advanced Classroom Management (3)
SPED6503 Instructional Design in Special Education (3)
SPED6691 Seminar in Professional and Leadership Development (1)
Take these courses last
SPED6690 Consultation and Collaboration (3)
SPED6691 Seminar in Professional and Leadership Development (1)

Adapted Curriculum, Option B: Teachers with a provisional (lateral entry) license or emergency license and students without a license.

Phase I (27 hours)
Take all of these courses first; they are required prerequisites for the courses below.
SPED5100 Introduction to Special Education (3)
SPED5175 Instructional Planning in Special Education (3)
SPED5270 Classroom Management (3)
SPED5273 Life Skills (3)
Take these courses next.
SPED5274 General Curriculum Access and Adaptations (3)
SPED5278 Systematic Instruction in the Adapted Curriculum (3)
SPED5316 Transition Planning and Service Delivery (3)
SPED6690 Consultation and Collaboration (3)
SPED6276 Internship: Adapted Curriculum (3)

Praxis II Specialty Area exams passed
Phase I completion form signed by advisor and filed with TEAL Office
Application for "A" license filed in TEAL office

Phase II (12 Hours)
Take these courses first

RSCH7113 Single Case Research (3)
SPED6691 Seminar in Professional and Leadership Development (1)

Take these courses next
RSCH6101 Educational Research Methods (3)
SPED6691 Seminar in Professional and Leadership Development (1)
Take these courses last
SPED6502 Advanced Classroom Management (3)
SPED6691 Seminar in Professional and Leadership Development (1)

Admission to Candidacy Requirements

Apply the semester prior to planned graduation. Full-time students must have completed 19 hours and be enrolled for at least an additional 10 hours. Part-time students must have completed at least 31 hours.

Assistantships

The Program typically has a limited number of graduate assistantships with salaries starting at $8,000/ academic

year. Applications are available from the Department of Counseling, Special Education, and Child Development (704-687-2531).

Internships
A three-hour internship is required for M.A.T. students. This internship can be done in a student's place of employment or the University can find a placement for you.

Practica
Most courses require students to apply the knowledge learned in classes to public/private school classrooms.

Capstone Experiences
The capstone experience will be fulfilled by completing either a Comprehensive Portfolio (recommended) or a Master's Research Project (with approval of advisor).

Electives
There are no elective hours in The M.A.T. in Special Education.

Advising
Upon acceptance into the program all students are assigned an advisor. Students are expected to meet with their advisor each semester to discuss their coursework.

Licensure
Successful completion of Phase I will lead to an initial license and successful completion o Phase II will lead eligibility for a North Carolina masters/advanced competencies license.

Committees
Each student will have a committee of two graduate faculty members who will provide guidance through the Capstone Experience. The committee will include the student's advisor, as well as one additional graduate faculty member chosen by the student.

Application for Degree
Apply the semester prior to planned graduation. Full-time students must have completed 19 hours and be enrolled for at least an additional 10 hours. Part-time students must have completed at least 31 hours.

Research Opportunities/Experiences
The Special Education faculty continuously achieves regional, state, and national recognition in scholarship, teaching, and research. As a result students will have multiple opportunities to become involved in practical, classroom-based research. In addition "action-research" projects are required in a variety of courses.

Tuition Waivers
A person qualifies for in-state tuition if he/she; is paid on the teacher salary schedule, has established legal residence in North Carolina, is employed full-time by a North Carolina public school, but only for "courses relevant to teacher certification or to professional development as a teacher." Contact the Graduate School for further information.

Financial Aid/ Financial Assistance
Information is available from the Teacher Education Advising and Licensure Office located in suite 119 New College of Education Building (704- 687-8725).

Program Certifications/Accreditation
The M.A.T. in Special Education is fully accredited by NCATE, CEC, and NCDPI.

POSTBAC FAST-TRACK LICENSURE PROGRAMS - SPECIAL EDUCATION

Students who hold a Bachelors Degree from an accredited university can obtain an initial North Carolina Special Education teaching license in one of two areas: General Curriculum or Adapted Curriculum.

Initial Licensure in Special Education: General Curriculum

General Curriculum, Option A: Teachers with a non-special education license. (18 hours)

Take all of these courses first; they are required prerequisites for the courses below.

SPED5173	Diagnostic Assessment (3)
OR	
SPED5270	Classroom Management (3)
SPED5175	Instructional Planning in Special Education (3)

Take these courses next.

SPED5272	Teaching Mathematics to Students with Special Needs (3)
SPED5275	Teaching Reading to Students with Special Needs (3)
SPED5277	Teaching Writing to Students with Special Needs (3)
SPED6475	Internship: General Curriculum (3)

Praxis II Specialty Area exams passed
Phase I completion form signed by advisor and filed with TEAL Office
Application for "A" license filed in TEAL office

General Curriculum, Option B: Teachers with a provisional (lateral entry) license or emergency license and Students without a license. (27 hours)

Take all of these courses first; they are required prerequisites for the courses below.

SPED5100 Introduction to Special Education (3)
SPED5173 Diagnostic Assessment (3)
SPED5175 Instructional Planning in Special Education (3)
SPED5270 Classroom Management (3)

Take these courses next.

SPED5272 Teaching Mathematics to Students with Special Needs
SPED5275 Teaching Reading to Students with Special Needs (3)
SPED5277 Teaching Writing to Students with Special Needs (3)
SPED6690 Consultation and Collaboration (3)
SPED6475 Internship: General Curriculum (3)

*EIST 5100 completed (ONLY for students without a license)
Praxis II Specialty Area exams passed
Phase I completion form signed by advisor and filed with TEAL Office
Application for "A" license filed in TEAL office

Initial Licensure in Special Education: Adapted Curriculum

Adapted Curriculum, Option A: Teachers with a non-special education license (21 hours)

Take all of these courses first; they are required prerequisites for the courses below.

SPED5270 Classroom Management (3)
SPED5175 Instructional Planning in Special Education
SPED5273 Life Skills (3)

Take these courses next

SPED5274 General Curriculum Access and Adaptations (3)
SPED5278 Systematic Instruction in the Adapted Curriculum (3)
SPED5316 Transition Planning & Service Delivery (3)
SPED6476 Internship: Adapted Curriculum (3)

Praxis II Specialty Area exams passed
Phase I completion form signed by advisor and filed with TEAL Office
Application for "A" license filed in TEAL office

Adapted Curriculum, Option B: Teachers with a provisional (lateral entry) license or emergency license and students without a license. (27 hours)

Take all of these courses first; they are required prerequisites for the courses below.

SPED5100 Introduction to Special Education (3)
SPED5175 Instructional Planning in Special Education (3)
SPED5270 Classroom Management (3)
SPED5273 Life Skills (3)

Take these courses next.

SPED5274 General Curriculum Access and Adaptations (3)
SPED5278 Systematic Instruction in the Adapted Curriculum (3)
SPED5316 Transition Planning and Service Delivery (3)
SPED6690 Consultation and Collaboration (3)
SPED6276 Internship: Adapted Curriculum (3)

Praxis II Specialty Area exams passed
Phase I completion form signed by advisor and filed with TEAL Office
Application for "A" license filed in TEAL office

Post-baccalaureate Admission Information

1) Students must have a bachelor's degree from a regionally accredited university.
2) Complete an Application for Admission as a post-baccalaureate student through the Graduate School

GRADUATE CERTIFICATES

Students who hold a Bachelors Degree from an accredited university can obtain an add-on license in Academically or Intellectually Gifted or earn a Supported Employment and Transition Graduate Certificate.

Academically or Intellectually Gifted Graduate Certificate

Any teacher seeking certification in Academically or Intellectually Gifted (AIG) must first hold a general teaching license in elementary, middle school, or high school instruction. A Graduate Certificate provides a consistent, cohesive structure for teachers seeking AIG licensure that both meets the state licensure mandate and also provides maximum flexibility for later graduate study.

Requirements:

SPED5211 Nature and Needs of Gifted Students (3)
SPED6124 Methods of Instructing Gifted Students (3)
SPED6161 Social and Emotional Needs of Gifted Students (3)
SPED6224 Adapting Curriculum Materials and Classroom Differentiation (3)

Admission Requirements for AIG Graduate Certificate

Students must have a bachelor's degree from a regionally accredited university.

1) Students must submit an Application for Admission to a Graduate Program

2) Students must provide original transcripts that indicate a minimum overall GPA of at least 2.75 and a junior/senior GPA of at least 3.0.
3) Students are not required to take the GRE or MAT. However, students must take the GRE or MAT before applying to the Special Education master's degree program.
4) If accepted into the master's degree program, a maximum of twelve (12) Graduate Certificate hours may be applied to the master's degree program in Special Education with the consent of the Graduate Program Coordinator.
5) Admission to the Graduate Certificate program does not ensure admission into a master's degree program.
6) Students must have a teaching license in an elementary, middle, or secondary education teaching field.

Supported Employment and Transition Graduate Certificate

The Graduate Certificate Program in Supported Employment and Transition is a 12-hour program. It serves two groups of educational professionals: (1) those who work in adult human-service agencies that provide on-the-job training and support (supported employment) for individuals with disabilities; and (2) those who work in school systems and are responsible for helping students with disabilities prepare to live, work, and learn as adults (transition from school to adulthood).

Program Objectives

As specialists in supported employment and transition for youth who have disabilities, graduates of the program are prepared to:
Work as job coaches and employment training specialists
Provide community-based training for persons with disabilities
Assist students in making the transition from school to adulthood.

Additional Requirements for Admission

Applicants to the program in Supported Employment and Transition are admitted to the Graduate School in a special category for certificate students. Admission requirements are listed in the Graduate School section of the catalog. Admission to a graduate certificate program at UNC Charlotte does not ensure subsequent admission to a graduate degree program.

Certificate Requirements

The Graduate Certificate Program in Supported Employment and Transition requires a minimum of 12 semester hours, at least six of which must be at the 6000 level. No transfer credit is accepted, although UNC Charlotte "distance learning" courses in Supported Employment and Transition may be applied to meet the program's requirements. Students must earn grades of B or better in each of the courses in the 12-hour program of study. The program includes the following core courses and support courses:

Core Courses (6 hours)

SPED5316	Transition Planning and Service Delivery (3)
SPED6321	Community-based Instruction (3)

Support Courses (6 hours) Choose two of the following courses:

SPED6351	Interagency Collaboration (3)
SPED6640	Seminar in Special Education: Working with Families (3)
SPED6311	Introduction to Supported Employment (3)
SPED6474	Internship: Mental Disabilities (3)

Courses In Special Education

SPED 5000. Topics in Special Education. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. *(On demand)*

SPED 5100. Introduction to Special Education. (3) Examines the historical antecedents of contemporary practices in the field of special education and current trends in the field of education. Addresses individualized general curriculum licensing standards and adapted or individualized independence curriculum licensing standards. Examines one's personal philosophy of special education and the diversity of students with disabilities. Identifies and critiques instructional implications of published research. Field-based clinical activity required. *(Fall, Spring, Summer)*

SPED 5111. Issues in Early Intervention for Children with Disabilities. (3) Current issues and trends in early intervention and preschool services for young children with disabilities and their families. Includes site visits scheduled throughout the semester. *(Fall)*

SPED 5112. Assessment of Young Children with Disabilities: B-K. (3) Strategies for interdisciplinary educational assessment to identify needs and plan appropriate programs for young children with disabilities and their families. Approximately 20 hours of field experiences. *(Fall)*

SPED 5173. Diagnostic Assessment. (3) Overview of the principles and practice of educational problem solving with an emphasis on curriculum-based assessment, formal assessment, special education eligibility, and linkages between assessment and instruction. Students will need to prepare for between 10-20 hours per semester for out of class projects. *(Fall, Spring, Summer)*

SPED 5175. Instructional Planning in Special Education. (3) Strategies for the development,

implementation, and monitoring of Individualized Education Plans (IEPs) for students with mild disabilities within the general education curriculum. Through the use of technology, students are expected to demonstrate proficiency in using the general education curriculum to develop and implement IEPs, unit, and individual lesson plans for instruction. *(Fall, Spring, Summer)*

SPED 5210. Instructional Methods and Materials: The Early Years. (3) Goal-setting, instructional design, and strategies for teaching young children with disabilities and their families. Includes a field-based assignment of approximately 20 hours. *(Spring)*

SPED 5211. Nature and Needs of Gifted Students. (3) Examination of the historical and philosophical perspectives of education for gifted and talented learners with emphasis on answering the question "What is giftedness?" Issues explored in the course include identification procedures, instructional options, the nature of intelligence and creativity, laws/policies, psychological and emotional correlates of talent, and current research findings. *(Spring)*

SPED 5270. Classroom Management. (3) Theoretical context of positive behavioral support and related applied behavior analysis strategies, including functional behavioral assessment and intervention planning, necessary to manage effectively the classroom behaviors of individuals or groups of students with special needs and to promote success in the learning environment. A field-based clinical assignment of approximately 15 hours is required. *(Fall, Spring, Summer)*

SPED 5272. Teaching Mathematics to Learners with Special Needs. (3) Prerequisites: SPED 5100, SPED 5173, SPED 5175, and SPED 5270. This course will provide students with effective teaching strategies and materials in math for learners with special needs for teacher licensure in Special Education: General Curriculum (NCDPI). Assessment and application of instructional techniques are included in the course. A minimum of 10 hours of field experience is required. *(Fall, Spring)*

SPED 5273. Life Skills. (3) Methods and materials for teaching functional skills in daily living, social, and vocational domains that will enable persons with special needs to live independently in their communities. Ecological assessment for life skills planning. Students will need to prepare for approximately 20 hours of field experience. *(Fall)*

SPED 5274. General Curriculum Access and Adaptations. (3) Prerequisites: SPED 5100, SPED 5175, SPED 5270, and SPED 5273. Strategies for developing curricular priorities for students who need adaptations to the general curriculum including ways to link to state standards in reading, math, writing, science, and other content areas. Requires 10-20 hours of field experience. *(Spring)*

SPED 5275. Teaching Reading to Learners with Special Needs. (3) Prerequisites: SPED 5100, SPED 5173, SPED 5175, and SPED 5270. This course will provide students with effective teaching strategies and materials in reading to learners with special needs for teacher licensure in Special Education: General Curriculum (NCDPI). A 12-hour field-based clinical experience is a required component of the course. Assessment and application of instructional techniques are included in the course. *(Fall, Spring)*

SPED 5277. Teaching Written Expression to Learners with Special Needs. (3) Prerequisites: SPED 5100, SPED 5173, SPED 5175, and SPED 5270. This course is will provide students with effective teaching strategies and materials in written expression to learners with special needs. A 12-hour field experience is a required component of the course. The field experience will include assessment and application of instructional techniques with students identified as receiving special education services. The course is designed to address core and specific competencies in teaching written expression to students with special needs for teacher licensure in Special Education: General Curriculum as stipulated by the North Carolina Department of Public Instruction *(Fall, Spring)*

Sped 5278. Systematic Instruction in the Adapted Curriculum. (3) Prerequisites: SPED 5100, SPED 5175, SPED 5270, and SPED 5273. Principles and procedures used to develop instructional support for students who need life skills and adaptations to general curriculum. Students are required to design and implement an instructional program. Requires 10-20 hours of field experience. *(Fall)*

SPED 5316. Transition Planning and Service Delivery. (3) Prerequisites: SPED 5100, SPED 5175, SPED 5270, and SPED 5273. Methods and procedures used in preparing students with disabilities for the world of work and independence are studied. *(Fall)*

SPED 6000. Topics in Special Education. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

SPED 6112. Learning Disabilities. (3) Examination of learning disabilities with emphasis on theories, issues, current trends, and definitions of learning disabilities as well as instructional strategies, program models, and major contributions to the field. *(On demand)*

SPED 6113. Mental Disabilities. (3) Examination of historical antecedents, major contributors, current practices, issues, and trends in the field of mental retardation. *(On demand)*

SPED 6114. Behavioral-Emotional Disabilities. (3) Examination of major contributors, theories, issues, current trends, and current practices in the field of behavior disorders. *(On demand)*

SPED 6117. Introduction to Persons with Severe Disabilities. (3) Social and cultural antecedents to contemporary services and supports for persons with severe disabilities. *(On demand)*

SPED 6121. Methods and Materials: Mental Disabilities. (3) Examination of the principles and practices of curriculum development and modification and current instructional methodologies for learners with mental disabilities. *(On demand)*

SPED 6122. Methods and Materials: Behavioral-Emotional Disabilities. (3) Planning, implementation, and evaluation of instructional programs with emphasis on academic and behavioral strategies, and individualization instruction for learners with behavioral-emotional disabilities. *(On demand)*

SPED 6123. Methods and Materials: Learning Disabilities. (3) Planning, implementation, and evaluation of instructional programs with emphasis on individual instruction, grouping for instruction, consultation, assessment, and program planning for learners with learning disabilities. *(On demand)*

SPED 6124. Methods of Instructing Gifted Students. (3) Prerequisite: SPED 5211. An introduction to the basic skills necessary to plan, implement, and evaluate instructional procedures that facilitate learning by gifted students. Specific theories discussed include Bloom, Bruner, Krathwohl, Parnes, Kohlberg. *(Fall)*

SPED 6125. Instructional Practices: Cross-Categorical. (3) Assessment procedures appropriate for use with students who are mildly disabled. Assessment information will be used to plan for the most appropriate instruction for students with mild disabilities receiving education in a cross-categorical setting. *(On demand)*

SPED 6126. Methods for Teaching Persons with Severe Disabilities. (3) Principles and procedures used to program instruction for persons who have severe disabilities. Students are required to design and implement an instructional program. *(On demand)*

SPED 6127. Curriculum for Persons with Severe Disabilities. (3) Selection of instructional programs appropriate for use with persons with severe disabilities. The student identifies strengths and weaknesses of educational programs and makes recommendations of their use with those persons. *(On demand)*

SPED 6224. Adapting Curriculum Materials and Classroom Differentiation. (3) Prerequisites: SPED 5211, SPED 6124. Students study methods of making accommodations to meet the gifted students in the regular classroom. Topics include differentiated lesson plans based on national and state standards as well as methods of adapting the learning environment to support multi-level learning. *(Spring)*

SPED 6241. Constructing Curriculum for Gifted Students. (3) Models of curriculum design for academically or intellectually gifted students. Emphasis on integrating philosophy of teacher, school, and community with child characteristics to create the appropriate course of study in a variety of school settings. *(On demand)*

SPED 6161. Social and Emotional Needs of Gifted Students. (3) Prerequisites: SPED 5211. An overview of current theory and practice in understanding gifted students social and emotional development. Topics discussed in class range from the social and emotional needs of the general population of gifted students to the unique needs of specific sub-groups of gifted students (e.g., gifted girls, gifted and learning disabled, gifted minority students). *(Spring)*

SPED 6270. Planning and Evaluation of Gifted Programs. (3) Prerequisites: SPED 5211, SPED 6124, SPED 6224, SPED 6261, approval of department. Theory and practice behind structuring programs for gifted students, from legal mandates to program design and evaluation. Practice in program design using the framework presented in current North Carolina law. *(On demand)*

SPED 6271. Leadership in Gifted Education. (3) Prerequisites: SPED 5211, SPED 6124, SPED 6224, SPED 6261, approval of department. Students gain hands-on practice in advocacy and leadership at the school, district, and state levels. Activities underway at the national level review and experienced when possible. *(On demand)*

SPED 6311. Introduction to Supported Employment. (3) Introduction to the concept of supported employment including models of supported employment, social skills in the workplace, assessment, and importance of independent living skills. *(On demand)*

SPED 6321. Community-Based Instruction. (3) Prerequisite: SPED 5316. Examination of curriculum guidelines for successful supported employment programs, norm-referenced and criterion-referenced assessment, independent living skills, and social skills in the workplace. *(On demand)*

SPED 6351. Interagency Collaboration. (3) Prerequisite: SPED 5316. Analysis of existing interagency agreements and practicum experiences with individuals from agencies providing supported employment or transition services. *(On demand)*

SPED 6471. Internship: Academically or Intellectually Gifted. (3) Prerequisites: SPED 5211, SPED 6124, SPED 6641; approval of department. Supervised experiences in observation, instruction, and administration of programs with gifted and talented students. Offered only on a Pass/No Credit grading. *(On demand)*

SPED 6472. Internship: Learning Disabilities. (3) Prerequisite: Approval of department. Supervised experiences in observation, instruction, and administration of programs for students with learning disabilities. Offered only on a Pass/No Credit grading. *(On demand)*

SPED 6473. Internship: Behavioral-Emotional Disabilities. (3) Prerequisite: Approval of department. Supervised experiences in observation, instruction, and administration of programs for students with behavioral-emotional disabilities. Pass/No Credit grading. *(On demand)*

SPED 6474. Internship: Mental Disabilities. (3) Prerequisite: Approval of department. Supervised experiences in observation, instruction, and administration of programs for students who have mental disabilities. Offered only on a Pass/No Credit grading. *(On demand)*

SPED 6475. Internship: General Curriculum. (3) Prerequisites: Grade of C or higher in all licensure courses; departmental approval. Supervised, field-based experiences in observation, instruction and administration of programs for students who have special needs. Includes on-campus seminars. Offered only on a Pass/No Credit grading. *(Fall, Spring)*

SPED 6476. Internship: Adapted Curriculum. (3) Prerequisites: Grade of C or higher in all licensure courses; departmental approval. Supervised, field-based experiences in observation, instruction and administration of programs for students who have special needs. Includes on-campus seminars. Offered only on a Pass/No Credit grading. *(Fall, Spring)*

SPED 6501. Applied Research in Special Education. (3) Prerequisite: RSCH 6101 and an "A" level special education teaching license. In-depth study of single-subject and qualitative research methods as they apply to the field of special education including data collection, research designs, data display and analysis, and writing research reports. *(On demand)*

SPED 6502. Advanced Classroom Management. (3) Prerequisite: An "A" level special education teaching license. Advanced theoretical context and related applied strategies necessary to manage and maintain effectively the classroom behaviors of individuals or groups of students. Field-based assessments of approximately 10 hours are required. *(Spring)*

SPED 6503. Instructional Design in Special Education. (3) Prerequisite: An "A" level special education teaching license. Advanced instructional design for learners who have significant difficulty in performing academic tasks with typical instruction. The course provides strategies for classroom-based assessment of individual needs using curriculum analysis, task analysis, and error analysis. It provides a framework for designing instructional sequences and error correction procedures that optimize progress. Field-based experiences of approximately 10 hours are required. *(Fall)*

SPED 6630. Problems and Issues of Persons with Severe Disabilities. (3) Issues, trends, and practices in the education of persons with severe disabilities which master teachers and supervisors may encounter with this population. *(On demand)*

SPED 6640. Seminar in Special Education: Working with Families. (3) Issues and best practices in developing family-professional partnerships to support the development of persons with disabilities. Pass/No Credit grading. *(On demand)*

SPED 6641. Seminar in Curriculum Development: Gifted and Talented. (3) Procedures and suggestions for developing programs for academically or intellectually gifted learners; philosophy of the teacher; school and community assumptions of curriculum; child characteristics; parental concerns; teaching styles. *(On demand)*

SPED 6690. Consultation and Collaboration. (3) Prerequisites: SPED 5100, SPED 5173, SPED 5175, and SPED 5270 **OR** SPED 5100, SPED 5175, SPED 5270, and SPED 5273. The course is designed to provide graduate students an opportunity to enhance their knowledge base and expertise in consultation and collaboration with parents, general education teachers, paraprofessionals, related service personnel, and/or human service personnel. *(Fall, Spring)*

SPED 6691. Seminar in Professional and Leadership Development. (1) Prerequisite: An "A" level special education teaching license. Design, development, and presentation of Master's Research Project or Comprehensive Portfolio. (May be repeated for credit.) *(Fall, Spring)*

SPED 6800. Individual Study in Special Education. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

SPED 7999. Master's Degree Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. *(Fall, Spring, Summer)*

SPED 8271. Single Subject and Qualitative Research in Special Education. (3) In-depth study of single-subject and qualitative research methods as they apply to the field of special education including data collection, research designs, data display and analysis, and writing research reports. *(On demand)*

SPED 8471. Professional Writing in Special Education. (2) Introduces the forms of professional writing expected of leaders in special education. Emphasis is placed on critical thinking, practice writing, and peer assessment. *(Fall)*

SPED 8472. Research Implementation in Special Education. (2) The process of conducting applied research in special education. Students design and implement a research study in collaboration with a faculty member. *(Spring)*

SPED 8473. Grant Writing in Special Education. (2). An experiential course in conceptualizing and developing applications for federal, state, local, and private grant funding for research and innovation efforts. A strong emphasis will be placed on applications for federal and state funding with a secondary focus on applications for corporate and private foundation funds. *(Fall)*

SPED 8474. Supervision of Student Teachers in Special Education. (5) An internship experience. The course includes seminar sessions and concentrated practice in supervision of special education student teachers under direct faculty supervision. *(Spring)*

SPED 8475. College Teaching in Special Education. (3) Issues and concepts in teaching adults and preparing special educators are applied in this college teaching experience. Supports students as they teach and/or co-teach university courses. May be repeated for up to 12 hours. *(Fall, Spring, Summer)*

SPED 8476. Doctoral Internship in Special Education. (3-6) Supplements students specialty areas through leadership experiences in a field related to or impacting special education (i.e., government, school district, agency). Provides students with an opportunity to explore their leadership skills in a new role within a field-based setting with the supervision of a mentor. May be repeated for up to 6 hours. *(Fall, Spring, Summer)*

SPED 8671. Doctoral Seminar in Special Education Research. (3) An intensive overview of the major research designs used in Special Education including group designs, single subject designs, survey research, qualitative research, and program evaluation. Introduces students to the research interests of the faculty. *(Fall)*

SPED 8672. Doctoral Seminar in Leadership in Special Education. (3) An intense review of the history, landmark events, professional organizations, and seminal articles in the field of special education and related disciplines. Also includes substantial coverage of federal and state policies, IDEA, and special education law. Prepares students to build professional leadership skills in areas such as time management, systematic planning, team leadership, and communication. *(Spring)*

SPED 8673. Doctoral Seminar in Innovation in Special Education. (3) An advanced study of innovation in special education and methods of systems change. Emphasizes research on practitioner acceptance and collaboration/ consultation skills. Prepares students to conduct program evaluations, data-based school quality enhancement plans, and offer technical assistance to schools, programs, and disability groups. *(Fall)*

SPED 8674. Doctoral Seminar in Teaching in Special Education. (3) Presents techniques used in the supervision and instruction of adult learners in college or school system settings. Also provides an intensive overview of current, empirically supported strategies for the instruction of learners across disability areas as an important knowledge base for leadership and college teaching roles in special education. *(Spring)*

SPED 8670. Advanced Research Topics in Special Education. (3) In-depth study of a topic(s) in special education research which addresses current issues in the field of special education. *(Fall, Spring, Summer)*

SPED 8699. Dissertation Proposal Seminar in Special Education. (3) Identification and definition of a research area and development of a proposal draft for an original research study appropriate for dissertation requirement. *(Summer)*

SPED 8800. Independent Study in Special Education. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer).*

SPED 8999. Dissertation Credits. Development, implementation, and evaluation of an original research study that addresses the needs of exceptional learners. *(Fall, Spring, Summer)*

SPED 9999. Doctoral Degree Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment during completion of a dissertation. *(Fall, Spring, Summer)*

TEACHING

Master of Arts in Teaching and Fast Track Initial Licensure

The Master of Arts in Teaching (M.A.T.) .) and the fast-track initial licensure program are designed specifically for the adult who is changing careers to enter the teaching profession. Both programs build on the candidate's solid bachelor's degree in an appropriate field as required for teacher licensure. The M.A.T. focuses on developing and extending the pedagogical, leadership, and research knowledge, skills, and dispositions needed by beginning and experienced teachers. The fast-track initial licensure program focuses on developing the pedagogical and leadership knowledge, skills, and dispositions needed by beginning teachers.

Program Descriptions

Phase One of the M.A.T. is identical to the fast-track licensure program. Candidates take professional education courses and any content-specific deficiency courses required for initial licensure in their field. The culminating experience is a semester-long full-time internship in a P-12 classroom to gain supervised teaching experience in the licensure field. Successful completion of all requirements in Phase One/fast-track initial licensure program leads to a recommendation for North Carolina initial licensure in the chosen field.

We strongly recommend that candidates in the fast-track licensure program who wish to apply to the M.A.T. do so before completing their sixth graduate credit hour as a post baccalaureate student.

In Phase Two of the M.A.T., candidates are expected to be employed as teachers in order to conduct the required action research and leadership assignments. Successful completion of all requirements in Phase Two, coupled with two years of successful teaching, leads to a recommendation for advanced licensure in North Carolina. Advanced licensure leads to a 10% pay increment for North Carolina teachers.

Licensure Fields, Associated Departments, and Graduate Coordinators

Fast-track initial licensure program
Office of Teacher Education Advising and Licensure
704-687-8725
Mr. Josh Avery, Licensure advisor
jdavery@email.uncc.edu

Art Education (K-12)
Department of Middle, Secondary, and K-12 Education
704-687-8875
Dr. Leslie Cook, Fine & Performing Arts advisor
Lcook9@email.uncc.edu
and
Department of Art
704-687-2473
Dr. Roy Strassberg, Department Chair
rstrassb@email.uncc.edu

Dance Education (K-12)
Department of Middle, Secondary, and K-12 Education
704-687-8875
Dr. Leslie Cook, Fine & Performing Arts advisor
Lcook9@email.uncc.edu
and
Department of Dance & Theatre
704-687-2482
Ms. Pam Sofras, Dance Education Coordinator
pasofras@email.uncc.edu

Elementary Education (K-6)
Department of Reading and Elementary Education
704-687-8889
Dr. Sue McKinney, Program coordinator
semckinn@email.uncc.edu

French, German, and Spanish Education (K-12)*
**Spanish is offered in the fast-track licensure program only, not the M.A.T.*
Department of Middle, Secondary, and K-12 Education
704-687-8875
Dr. Lan Quach, Program coordinator
lquach@email.uncc.edu

Middle Grades Education (6-9)
Options: English/Language Arts, Mathematics, Science, Social Studies
Department of Middle, Secondary, and K-12 Education
704-687-8875
Dr. Kim Hartman, Program Coordinator
khartman@email.uncc.edu

Music Education (K-12)
Department of Middle, Secondary, and K-12 Education
704-687-8875
Dr. Leslie Cook, Fine & Performing Arts advisor
Lcook9@email.uncc.edu
and
Department of Music
704-687-2472
Dr. Judith Sullivan, Music education co-coordinator
jasulliv@email.uncc.edu
Dr. Randy Haldeman, Music education co-coordinator
rkhaldem@email.uncc.edu

Special Education (K-12)
Options: Adapted Curriculum or General Curriculum
Department of Special Education and Child Development
704-687-8772

Dr. Campbell-Whatley, Program coordinator
Gcambel@email.uncc.edu

Secondary Education (9-12)
Options: English, Mathematics, History/Comprehensive Social Studies, Biology, Chemistry, Comprehensive Science, Earth Sciences, Physics
Department of Middle, Secondary, and K-12 Education
704-687-8875
Dr. Kim Hartman, Program Coordinator
khartman@email.uncc.edu

Teaching English as a Second Language (K-12)
Department of Middle, Secondary, and K-12 Education
704-687-8875
Dr. Theresa Perez, Program coordinator
tperez@email.uncc.edu

Theatre Education (K-12)
Department of Middle, Secondary, and K-12 Education
704-687-8875
Dr. Leslie Cook, Fine & Performing Arts advisor
Lcook9@email.uncc.edu
and
Department of Dance & Theatre
704-687-2482
Mr. Matt Webster, Theatre Education coordinator

Program Goals
Successful completion of Phase One or the fast-track licensure program meets all North Carolina standards for initial licensure. Successful completion of the entire M.A.T., coupled with two years of successful teaching experience, meets all North Carolina standards for advanced licensure. Those standards plus the Conceptual Framework of the College of Education provide programmatic structure so that:

By the end of the Phase One of the M.A.T. program (the fast-track licensure portion), successful candidates will be able to meet the INTASC standards required of beginning teachers:

1) Content Pedagogy: The teacher understands the central concepts, tools of inquiry, and structures of the discipline he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.
2) Student Development: The teacher understands how children learn and develop and can provide learning opportunities that support a child's intellectual, social, and personal development.
3) Diverse Learners: The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.
4) Multiple Instructional Strategies: The teacher uses a variety of instructional strategies to encourage student development of critical thinking, problem solving, and performance skills.
5) Motivation and Management: The teacher uses understanding of individual and group motivation and behavior to create a learning environment that encourages social interaction, active engagement in learning, and self motivation.
6) Communication and Technology: The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.
7) Planning: The teacher plans based upon knowledge of subject matter, students, the community, and curriculum goals.
8) Assessment: The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner.
9) Reflective Practice: Professional Growth: The teacher is a reflective practitioner who continually evaluates the effects of his or her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.
10) School and Community Involvement: The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well being.

By the end of the second phase of the program, successful candidates will be able to demonstrate the advanced competencies in their licensure fields, summarized in the following objectives:

1) Educational research and assessment. Teachers will demonstrate knowledge of, skills in, and application of educational research and assessment, including instructional modifications for diverse learners.
2) Advanced pedagogy. Teachers will demonstrate advanced levels of pedagogical knowledge and skills which involve appropriate responses to variations in students' learning needs and learning styles as well as the curriculum expectations of North Carolina.
3) Advanced content knowledge. Teachers will demonstrate advanced levels of knowledge in their academic discipline.
4) Professional Growth and Leadership. Teachers will demonstrate self-directed, self-reflective professional behavior and collaborative leadership skills that are focused on the improvement of educational practice and students' learning.
5) Students' Learning. Teachers will demonstrate a positive impact on students' learning in P-12 classrooms.

Program Requirements

The Master of Arts in Teaching requires a total of 39 hours of coursework in professional education and the content field. Elementary and special education do not have a content field requirement. The fast-track licensure program requires from 18 to 27 hours of coursework, depending on the licensure track.

Additional coursework in Phase One of the M.A.T. (the fast-track licensure program) might be required to satisfy background requirements in the content field. Candidates must have the appropriate degree and specific coursework in the required competency areas within the intended content field of teaching. Candidates will be notified of any such additional requirements with their acceptance letter.

These new M.A.T. and fast-track initial licensure programs respond to licensure requirements established by the North Carolina Department of Public Instruction and to recent federal guidelines established through the No Child Left Behind legislation. Because these programs are evolving, a College of Education website contains the most up-to-date information about specific programmatic and background requirements for each licensure field: http://education.uncc.edu/mat.

Advising

Each candidate will have an assigned advisor within the department associated with their licensure field. In the middle grades, secondary and K-12 fields, this advisor will collaborate with faculty in the appropriate department in the College of Arts and Sciences when helping candidates choose advanced coursework in those disciplines.

Licensure

At the end of Phase One, the candidate will apply for the North Carolina initial "A" license through the Office of Teacher Education Advising and Licensure (TEAL). At the end of Phase Two and two years of successful teaching, the candidate will apply for the North Carolina advanced "M" license through the Office of Teacher Education Advising and Licensure (TEAL).

Admission Requirements for the Master of Arts in Teaching

(Forms available at http://education.uncc.edu/mat)

1) A bachelor's degree from an accredited college or university:
   a. For middle grades, secondary education, and K-12 education in art, dance, music, theatre, French, or German, the bachelor's degree should have a major or equivalent in the content area of the licensure field selected.
   b. For elementary and special education, the bachelor's degree should have strong breadth in the liberal arts associated with any major.
2) An undergraduate GPA of 2.75 overall and 3.0 in the junior/senior years
3) A score at the 30th percentile or higher on the Graduate Record Exam (GRE) or Millers Analogies Test (MAT)
4) A satisfactory essay providing a statement of purpose
5) Satisfactory recommendations from three professionals able to judge the applicant's potential for working with children and youth

Capstone Experience

M.A.T. candidates will have a choice of a comprehensive portfolio or master's research project, both of which are supported by a series of seminars in ELED, MDSK, or SPED 6691. The candidate's graduate committee will assist in the development of the final product of this capstone experience and will participate in evaluating that product according to established rubrics.

Assistantships

There are limited opportunities within the departments of the College of Education for graduate assistantships for full-time graduate students in a degree program. Contact the associated departments for more information.

Admission Requirements for the Fast-Track Initial Licensure Program

(Forms available at http://education.uncc.edu/mat)

1) A bachelor's degree from an accredited college or university:
   a. For middle grades, secondary education, and K-12 education in art, dance, music, theatre, French, German, or Spanish, the bachelor's degree should have a major or equivalent in the content area of the licensure field selected.
   b. For elementary and special education, the bachelor's degree should have breadth in the liberal arts associated with any major.
2) An undergraduate GPA of 2.5 overall
   OR
   Passing scores on Praxis I tests **and** a GPA of 3.0 in one of the following: (a) the undergraduate major, (b) all coursework in the senior year, or (3) 15 licensure-related credit hours completed within the last 5 years
3) Satisfactory recommendations from three professionals able to judge your potential for working with children and youth

Courses specific to the Master of Arts in Teaching and Fast-Track Initial Licensure Programs

The courses described below are specifically designed for Phase One of the M.A.T. and the fast-track initial licensure programs. Other graduate courses included in Phase Two of the M.A.T. are described with the respective M.Ed. programs, with lists of general graduate courses in Education, and in the content fields in the College of Arts and Sciences. The MAT website lists the

courses required in each Phase of each licensure track and their sequencing: http://education.uncc.edu/mat .

Art Education Courses

ARTE 5121. Art Education Methods I (K-12). (3) Prerequisite: Admission to MAT or Fast-track Licensure Program. Analysis of learning theories as related to growth and development in visual arts; organization of tools, media and materials; curriculum design in planning art units and lesson plans; evaluation and motivation techniques. Approximately 40 hours of clinical/classroom-based field experience required. Studio/Lecture course. Six contact hours. *(Fall, Spring)*

ARTE 5122. Art Education Methods II (K-12). (3) Prerequisites: ARTE 5121 and 3 credit hours of ARTE 6021 with a "B" or better grade. Development of objectives for art education based on personal and historical references, philosophy, and psychology. Relationship of the arts and artists to contemporary society. Curriculum design, classroom management, and approximately 40 hours of clinical/classroom-based field experience required.- Studio/Lecture course. Six contact hours. *(Fall, Spring)*

ARTE 6021. Topics: Graduate Art Studio. (3) Prerequisite: Admission to MAT or Fast-track Licensure Program and consent of instructor. Supervised individual creative research of artistic problems in a particular discipline with appropriate documentation of resulting research. Six contact hours. May be repeated for credit. *(Fall, Spring)*

ARTE 6923. Advanced Art Education Methods. (3) Prerequisite: Grade of B or better in ARTE 5121 and ARTE 5122, and MAT Phase Two standing. Understand and demonstrate knowledge of art education research, art content, advanced pedagogy, and leadership through selected readings, presentations, and research paper. Continue work on Master's Research Project or Master's Comprehensive Portfolio. Studio/lecture course. Six contact hours. *(On demand.)*

Dance Education Courses

DANC courses under development

Elementary Education Courses

ELED 5100. Intensive Orientation to Teaching. (6) Major instructional, organizational, management, and assessment approaches within models of teaching. Theories and research about child development and diversity. North Carolina Standard Course of Study (NCSCOS), state and local assessment programs, teacher accountability, school laws and responsibilities of teachers, teacher evaluations and high stakes accountability, and working with other stakeholders in the education process. Modern day contexts, issues, and problems of schools with reference to educational history and philosophy. Requires extensive clinical experience.

ELED 5200. Teaching Literacy. (3) Basic methodology in teaching reading and language arts, including the use of children's literature. Examination of the K-6 literacy curriculum and instructional materials with reference to developmental stages of learning and the impact of diversity in literacy instruction and curriculum integration. Emphasis on basic, effective teaching strategies and organizational patterns expected to be used in the schools. Requires extensive clinical experience.

ELED 5201. Teaching Mathematics. (3) Basic methodology in teaching mathematics from a constructivist perspective, with examination of other perspectives related to major models of teaching. Examination of the K-6 mathematics curriculum and instructional materials with reference to curriculum integration and to developmental stages of learning and the impact of diversity in mathematics instruction. Emphasis on basic, effective teaching strategies and organizational patterns expected to be used in the schools. Includes attention to prospective teachers' mathematical knowledge. Requires extensive clinical experience.

ELED 5300. Assessing, Modifying, and Integrating Literacy Instruction. (3) Assessment of student learning, evaluation of effectiveness of instruction, and modification of methods and materials for diverse learners. Closer examination of performance expectations by grade level, EOG testing, and effective instruction for struggling learners. Continued expectation for curriculum integration and use of models of teaching as an organizer for understanding instruction, assessment, and modifications. Applications of technology in literacy instruction. Design, implementation, and evaluation of literacy lessons and brief literature-focused integrated unit. Requires extensive clinical experience.

ELED 5301. Assessing, Modifying, and Integrating Mathematics Instruction. (3) Application, refinement, and expansion of pedagogical knowledge gained in the first mathematics pedagogy course, with focus upon assessment of student learning, evaluation of effectiveness of instruction, and modification of methods and materials for diverse learners. Closer examination of performance expectations by grade level, EOG testing, and effective instruction for struggling learners. Continued expectation for curriculum integration and use of models of teaching as an organizer for understanding instruction, assessment, and modifications. Applications of technology in mathematics instruction. Design, implementation, and evaluation of math lessons and brief mathematics-centered integrated unit. Requires extensive clinical experience for non-lateral entry teachers.

ELED 5400. Teaching and Integrating Science. (3) Reviews and extends models of teaching from ELED 5100 as applied to the teaching of science. Examines the K-6 science curriculum and instructional materials with

reference to curriculum integration, developmental stages of learning, and the impact of diversity in science instruction. Emphasis on basic, effective teaching strategies and organizational patterns expected to be used in the schools. Includes attention to prospective teachers' background knowledge as well as teaching competencies in all aspects of the K-6 NC science curriculum. Applications of technology in science instruction. Design, implementation, and evaluation of science lessons and brief science-centered integrated unit. Evaluation of student learning and strategies for instructional modifications for diverse learners. Requires extensive clinical experience for non-lateral entry teachers.

ELED 5401. Teaching and Integrating Social Studies. (3) Reviews and extends models of teaching from ELED 5100 as applied to the teaching of social studies. Examines the K-6 social studies curriculum and instructional materials with reference to curriculum integration and to developmental stages of learning and the impact of diversity in social studies instruction. Emphasis on basic, effective teaching strategies and organizational patterns expected to be used in the schools. Includes attention to prospective teachers' background knowledge as well as teaching competencies in all aspects of the K-6 NC social studies curriculum. Applications of technology in social studies instruction. Design, implementation, and evaluation of social studies lessons and brief social studies-focused integrated unit. Evaluation of student learning and strategies for instructional modifications for diverse learners. Requires extensive clinical experience for non-lateral entry teachers.

ELED 6470. Elementary Education Clinical Experience. (3-6) Prerequisite: completion of all coursework required for the "A" license and department approval. Application required one semester in advance. Full-time internship in an approved K-6 school setting. *(Fall, Spring)*

French, German, and Spanish Education Courses

FORL 5200. Secondary Methods—Foreign Languages. (3) Prerequisite: Admission to the fast-track initial licensure program or the Master of Arts in Teaching. Current trends and practices in teaching foreign and second languages in the middle school and high school, with emphasis on practical applications. Addresses state-mandated competencies. Required for licensure in the teaching of foreign language. *(Fall) (Evenings)*

FORL 5201. Foreign Languages in the Elementary School Methods. (3) Prerequisite: Admission to the fast-track initial licensure program or the Master of Arts in Teaching. Current trends and practices in teaching foreign and second languages in the elementary school, with emphasis on practical applications. Addresses state-mandated competencies. Required for licensure in the teaching of a foreign language. *(Spring) (Evenings)*

Other **FORL** courses under development

Middle, Secondary, and K-12 Education Courses

EDUC 5100. Diverse Learners. (3) Strategies for adapting instruction to meet the learning needs of all members of middle or secondary classrooms, including students at risk for school failure, individuals from culturally and linguistically diverse backgrounds, gifted students, and students with disabilities. Suggested prerequisite: MDSK 6162. Extensive clinical experience required.

ENGL 5254. Teaching English/Communications to Middle/Secondary School Learners. (3) Designing integrated approaches that develop and enhance students' abilities to write, speak, listen, interpret texts, think critically, and explore new technologies. Developing rationales for integrated teaching; planning, design, and implementation of lessons, units, and course; methods of teaching a variety of genres; and other specialized concerns. Prerequisite: MDSK 6162. Extensive clinical experience required.

MAED 5132. Teaching Math to Middle School Learners. (3) Preparation to teach mathematics at the middle school level with emphasis on problem solving, mathematical connections, manipulatives, cultural diversity, and assessment, including school-based field experiences. Prerequisite: MDSK 6162. Extensive clinical experience required.

MAED 5251. Teaching Math to Secondary School Learners. (3) Preparation to teach mathematics at the secondary school level with emphasis on problem solving, mathematical connections, manipulatives, cultural diversity, and assessment, including school-based field experiences. Prerequisite: MDSK 6162. Extensive clinical experience required.

MDLG 5130. The Middle Grades Experience. (3) Current curricular and instructional programs and their impact on the learning of contemporary adolescents. Reform efforts currently underway in American schools that attempt to address issues surrounding these and other current practices. Developmental characteristics of the early adolescent learner. Extensive clinical experience required.

MDSK 5251. Teaching Science to Middle and Secondary School Learners. (3) Comprehensive overview of both science education and the nature of science. Planning and implementing effective learning experiences and assessment for both the number and the diversity of learners in a middle or secondary science classroom. Extensive clinical experience required.

MDSK 5253. Teaching Social Studies to Middle and Secondary School Learners. (3) Comprehensive overview of history and social studies education with an

emphasis on providing opportunities for history and social studies teachers to create relevant, stimulating, content specific lessons for the diversity of students in middle or secondary schools. Extensive clinical experience required.

MDSK 6161. Research and Analysis, K-12 Teaching. (3) Prerequisite: completion of all coursework required for the "A" license and department approval. Concepts, methods, and practices used by effective teachers in their daily classroom routines, including systematic observation skills, interpretation of observation data, and application of research-based findings. Requires a full-time, 10 to 15 week internship experience of teaching (lateral entry employment or placement with a licensed teacher) in the area for which you are seeking licensure. Includes formal observations in the intern's classroom by university faculty and/or school-based supervisors. *Application required.*

MDSK 6162. Planning for K-12 Instruction. (3) Introduction to the systematic process of planning for effective classroom instruction and assessment. Special attention will be given to the related use of technology in the development of effective and systematic learning environments. It is a recommended pre-requisite for EDUC 5100 and most of the methods courses, as you will need lesson planning skills to be successful in most of your other courses. Extensive clinical experience required.

READ 5255. Integrating Reading and Writing in the Content Areas. (3) Critical role of reading in learning course content in almost every subject area in the curriculum. Further, it is often the vehicle for assessing students across subjects. Methods for helping students become better readers. Extensive clinical experience required.

SECD 5140. The Secondary School Experience. (3) Overview of the developmental characteristics of the adolescent learner and their relationship to instruction. Context of American High Schools and the effects of those schools on the learning of contemporary adolescents. Reform efforts currently underway in American high schools that attempt to address some of the problems with current practice. Extensive clinical experience required.

<u>Music Education Courses</u>

MUED 5140. Secondary Choral Methods. (2). Pre-requisite: Admission to the MAT or to the Fast-Track Licensure Program. Rehearsal techniques, repertoire, and administration of junior and senior high school choral groups. Includes mixed concert choirs, male and female choirs, and techniques for show/jazz choir. Six hours of field work required. Three contact hours. (Fall)

MUED 5195. Secondary Instrumental Methods. (2). Pre-requisite: Admission to the MAT or to the Fast-Track Licensure Program. Musical, organizational, and administrative aspects of teaching middle and secondary school bands and orchestras. Methods, materials and literature for teaching instrumental music. Five hours of field work required. (Spring)

MUED 5137. Vocal Pedagogy. (3) Pre-requisite: Admission to MAT or Fast-Track Licensure Program. A methodology course designed to present the physiological and acoustical bases for a coherent approach to the teaching of singing. Areas of vocal technique to be studied include the physiology of the voice, which includes posture, breathing, onset of sound, articulation , vocal registration , and other related areas. *(Fall)*

MUSC 5001. Topics in Music. (1-6) Pre-requisite: Admission to MAT or MME and permission of the instructor. Special topics in music; may be repeated for credit. Specific topics courses will be field-tested and modified to become permanent courses. *(Fall, spring)*

MUED 5194. Elementary Instrumental Methods. (2) Pre-requisite: Admission to MAT or Fast-Track Licensure Program and consent of the instructor. Study and analysis through individual evaluation and in-class group performance of current elementary instrumental; method books and teaching strategies. Field work required. Two contact hours. *(Fall)*

MUED 5151. Computer Skills for the Music Educator. (2) Pre-requisite: Admission to MAT or Fast-Track Licensure Program and consent of the instructor. The study of contemporary MIDI and computer related technologies available to the music educator. Two contact hours. *(Fall)*

MUSC 5170. Graduate Survey of Music History. (3) A survey of the materials of Western music and an overview of the historical development and relationships of musical styles.

MUSC 6601. Graduate Seminar in Music History. (3) Prerequisite: MUSC 5170 or consent of the department. Individual or group investigation of a selected style period, composer, genre, or topic of current interest in music history. This course provides an introduction to research methods, documentary sources, and critical analysis that will culminate in a formal research paper worthy of scholarly presentation and/or publication. *(Spring)*

<u>Special Education Courses</u>

See descriptions of **SPED** courses under Special Education

<u>Teaching English as a Second Language Courses</u>

READ 6204. Teaching Reading to English Language Learners. (3) Research, theory, and instructional practices related to the reading process and reading instruction for English Language Learners in K-12

classrooms; relationship between language development and reading; examination of instructional materials including literature, basal readers, and information texts; field-based application of course content.

TESL 5103. Methods in Teaching English as a Second Language. (3) For current and future teachers of English as a Second Language (TESL) to master a variety of approaches, methods, and techniques of teaching ESL and other competencies prescribed by the State of North Carolina. *(Fall)*

TESL 5104. Authentic Assessment. (3) For current and future teachers of English as a Second Language (TESL) to develop multiple criteria assessment models as TESL diagnosticians and to master other competencies prescribed by the State of North Carolina. *(Spring)*

TESL 6204. Multicultural Education. (3) Assists teachers and other school personnel acquire skills in multicultural curriculum design and delivery. Examines issues that impede poor and minority children from reaching their full potential in today's public schools, and addresses the need to develop instructional practices that speak to their low level of attainment. Emphasizes culture and language acquisition instruction for teaching in a pluralistic society.

TESL 6470. Internship in Teaching English as a Second Language. (3) Prerequisite: Application and permission of department. Program of experiential learning activities in an approved K-12 setting. Requires a full-time, 10 to 15 week internship experience of teaching English as a Second Language (lateral entry employment or placement with a licensed teacher). Includes formal observations in the intern's classroom by university faculty and/or school-based supervisors. *(Fall, Spring)*

Theatre Education Courses
THEA courses under development

TEACHING ENGLISH AS A SECOND LANGUAGE

Department of Middle Grades, Secondary and K-12 Education

College of Education Room 324
(704) 687-8875
http://education.uncc.edu/mdsk/
tperez@email.uncc.edu
M.Ed. TESL website: http://education.uncc.edu/tesl

Degree

M. Ed.

Coordinator

Dr. Theresa Perez

Graduate Faculty

Lynne Bailey, Assistant Professor
Lillian B. Brannon, Professor
Boyd H. Davis, Professor
Warren DiBiase, Associate Professor
Kim Hartman, Assistant Professor
Charles Hutchison, Assistant Professor
Jeanneine Jones, Professor
Ronald F. Lunsford, Professor
Theresa Perez, Professor
Pilar Blitvich, Assistant Professor
David Pugalee, Associate Professor
Lan Hue Quach, Assistant Professor
Blair A. Rudes, Assistant Professor
Ralf Thiede, Associate Professor

MASTER OF EDUCATION IN TEACHING ENGLISH AS A SECOND LANGUAGE

The 39 hour M.Ed. Program in Teaching English as a Second or Foreign Language is designed to prepare teachers to work with K-12 and adult EFL (English as a Foreign Language) students both domestically and overseas. The program addresses current trends in the field by providing a balanced emphasis on the communication, cultural and linguistic features of learning English as a second language. It offers two tracks: a licensure track and a non-licensure track. The licensure track requires students to hold a current "A" level or initial license in another teaching discipline to receive licensure in ESL. Individuals holding an "A" license (initial license) receive an "M" license upon the completion of the program and are prepared for teaching in P-12 public school settings. The non-licensure track has no such requirement. Persons interested in the non-licensure track may include individuals seeking a position in community colleges, agencies, multinational corporations or overseas settings.

Licensure Track

Students must possess an "A" level licensure in another teaching discipline to receive licensure to teach ESL and the accompanying Master's degree. Check with the Department of Middle Grades, Secondary and K-12 Education (MDSK) for the specific requirements.

Teaching English as a Second Language (Licensure)

I. Foundations (9 hours)
ENGL6161 Introduction to Linguistics (3)
MDSK6356 Curriculum Studies (3)
RSCH6101 Educational Research Methods (3)

II. Content Specialization (9 hours)
ENGL6163 Language Acquisition (3)
ENGL6070 Comparative Language Studies for Teachers (3)
One course from the following:
ENGL6127 Seminar in Language, Culture, and Society (3)
ANTH5120 Intercultural Communications (3)

III. Instructional Specialization (12 hours)
TESL5104 Authentic Assessment (3)
TESL5103 Methods in Teaching English as a Second Language (3)
EDUC7126 Comparative Education
TESL6476 Collaboration and Leadership in TESL (3)
(Prerequisite: Completion of Foundations, Content Specialization, and Instructional Specialization courses)

IV. Instructional Leadership (3 hours)
MDSK6260 Teacher Leadership (3)
(Prerequisite: Completion of Foundations, Content Specialization, and Instructional Specialization courses)

V. Electives (6 hours)

Non-Licensure Track

Students do not need to possess a teaching license to receive a Master's degree in Teaching English as a Second Language. Check with the Department of Middle Grades, Secondary and K-12 Education (MDSK) for the specific requirements.

Teaching English as a Second Language (Non-Licensure)

I. Foundations (9 hours)
ENGL6161 Introduction to Linguistics (3)
MDSK6356 Curriculum Studies (3)
RSCH6101 Educational Research Methods (3)

II. Content Specialization (9 hours)
ENGL6163 Language Acquisition (3)
ENGL5263 Linguistics and Language Learning (3)
ENGL6070 Comparative Language Studies for Teachers (3)
One course from the following:
ENGL6127 Seminar in Language, Culture, and Society (3)
ANTH5120 Intercultural Communications (3)

III. Instructional Specialization (12 hours)
TESL5104 Authentic Assessment (3)
TESL5103 Methods in Teaching English as a Second Language (3)
TESL6476 Collaboration and Leadership in TESL (3)
TESL6470 Internship in Teaching English as a Second Language
(Prerequisite: Completion of Foundations, Content Specialization, and Instructional Specialization courses)

IV. Electives (6 hours)

Admission Requirements

Must meet all admission requirements as determined by the College of Education and the Graduate School

Internship

Required for both licensure and non-licensure programs. Both domestic and international Internships are available.

Master's Research Project

Students select the Master's Research Project or the Master's Thesis to fulfill this requirement. Students work with a three-member faculty committee to fulfill this requirement. One of the members of the committee is the student's advisor.

Language Requirements

Show evidence of one semester of a foreign language at the college level.

Assistantships

A very limited number of assistantships are available through the Department of Middle Grades, Secondary and K-12 Education (MDSK). There may also be opportunities for teachers to work in the English Language Teaching Institute on campus.

Research Opportunities

There are numerous opportunities for students to participate in research through their courses and/or programs abroad.

Courses In Teaching English As A Second Language

TESL 5104. Authentic Assessment (formerly Second Language Diagnosis and Evaluation). (3) For current and future teachers of English as a Second Language (TESL) to develop multiple criteria assessment models as TESL diagnosticians and to master other competencies prescribed by the State of North Carolina. *(Spring)*

TESL 5103. Methods in Teaching English as a Second Language (formerly Teaching English as a Second Language). (3) For current and future teachers of English as a Second Language (TESL) to master a variety of approaches, methods, and techniques of teaching ESL and other competencies prescribed by the State of North Carolina. *(Fall)*

TESL 6000. Topics in Teaching English as a Second Language. (1-6) May include classroom and/or clinical experiences in the content area. With department

approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

TESL 6204. Multicultural Education. (3) Assists teachers and other school personnel acquire skills in multicultural curriculum design and delivery. Examines issues that impede poor and minority children from reaching their full potential in today's public schools, and addresses the need to develop instructional practices that speak to their low level of attainment. Emphasizes culture and language acquisition instruction for teaching in a pluralistic society.

TESL 6470. Internship in Teaching English as a Second Language (formerly Internship). (3) Prerequisite: Permission of department. Program of experiential learning activities in the student's level and/or area of academic concentration in an approved setting. (Fall, Spring)

TESL 6476. Collaboration and Leadership in TESL (formerly The ESL Professional in the 21st Century). (3) Prerequisite: Permission of department. (formerly supervised experiences in school or non-school teaching or training with an emphasis on developing skills as an educational professional.) This seminar helps students develop skills in identifying problems ESL students encounter in mainstream classrooms, ascertaining if mainstream teachers are accommodating ESL students, collaborating with other professionals in applying accommodations, and also in the application of complex instruction for the English language learners. *(Fall, Spring)*

TESL 6691. A. B. C. Seminar in Professional Development. (1, 1, 1) Seminar focused on self-direction and professional development of English as Second Language Specialists (ESL), with an increasing emphasis on becoming instructional leaders, as students plan to meet their own learning needs in instructional expertise; expand their awareness of the role of the ESL specialist; plan their program; use technology in presentations; and develop their Master's Research Project or Comprehensive Portfolio.

TESL 6800. Individual Study in Teaching English as a Second Language. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

TESL 7999. Graduate Residence. (1) Meets Graduate School requirement for continuous enrollment during completion of a research project, thesis, or portfolio. *(Fall, Spring, Summer)*

GENERAL GRADUATE COURSES IN EDUCATION

Education

EDUC 5000. Topics in Education. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

EDUC 6000. Topics in Education. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

EDUC 6100. Theories of Human Development and Learning. (3) Concepts of development; philosophical antecedents of developmental and learning theories; role of theory in explaining human nature; components of theoretical explanations; evaluating theories. *(On demand)*

EDUC 6102. The Person and School in Urban Society. (3) The basic philosophical theories and sociocultural forces that influence the objectives, structure and programs of schools, agencies and institutions in urban society. *(On demand)*

EDUC 6254. Individualizing Instruction for Diverse Learners. (3) Instructional modifications/adaptations related to meeting the individual learning needs of students. Emphasis on teaming, collaboration, and creating a classroom environment in which all learners can be successful. Differences among learners that are influenced by development, exceptionalities, and diversity are explored using case study methodology. *(Fall, Spring, Summer)*

EDUC 6274. Contexts and Issues in the Teaching of English. (4) Prerequisites: Admission to the M.A. in English Education or the M.Ed. in Middle/Secondary Education. Examine the key concepts of the discipline. Consider own identities as readers, writers, teachers, researchers, makers of meaning. Emphasis upon critical approaches and pedagogical issues, with special attention to technology in the teaching of language, composition, and literature, as well as cultural contexts for the study of English. *(Fall) (Evenings)*

EDUC 6651. Piagetian Theory. (3) Prerequisite: Permission of the instructor. Advanced seminar for investigation of Piagetian theory with emphasis on genetic epistemology, research and neo-Piagetian concepts. *(On demand)*

EDUC 6674. Applied Research Methods in the Teaching of English. (4) Prerequisites: Completion of ENGL/EDUC 6274 and 12 hours of graduate credit

toward the M.A. in English Education. Building on the research basis established in ENGL/EDUC 6274, this course provides the opportunity to apply research methods in classrooms. Examine identities as readers, writers, teachers, and especially as classroom researchers. *(Spring) (Evenings)*

EDUC 6974. Thesis/Project in the Teaching of English. (6) Research integrating the fields of English and Education in a theoretical or application-oriented study. If the thesis/project is the outgrowth of previous coursework rather than a new topic, then considerable additional research and exposition must be done. *(Fall, Spring)*

EDUC 7126. Comparative Education. (3) Analysis of sociocultural forces affecting educational planning and comparison of contemporary educational systems of selected countries and the United States. *(Spring) (Evenings)*

Research

RSCH 6101. Research Methods. (3) Identification of logical, conceptual, and empirical research problems; application of methods and procedures, including conducting library research, interpreting research findings, and preparing reviews of related literature. *(Fall, Spring, Summer)*

RSCH 6109. Assessment and Evaluation Methods. (3) Fundamentals of individual and group assessment, including selection, administration, and interpretation of norm-referenced and criterion-referenced assessment instruments and demonstration of competencies prescribed by the State of North Carolina and other professional organizational standards. *(Fall, Spring)*

RSCH 6110. Descriptive and Inferential Statistics. (3) Identification of objective reporting and decision-making statistics; application of descriptive and inferential methods; illustration of elementary parametric and non-parametric techniques in hypothesis testing; and, demonstration of the fundamentals of data processing. *(Fall, Spring, Summer)*

RSCH 6120. Advanced Statistics. (3) Application of advanced topics in probability and statistics as a basis for objective decision-making, with emphasis on the following practices through analysis of prepared data: multiple correlation and regression, one-way and n-way analysis of variance and covariance, advanced ANOVA designs, advanced non-parametric methods, and, selected multivariate statistical procedures. *(Spring) (Evenings)*

RSCH 6130. Presentation and Computer Analysis of Data. (3) Fundamentals of data presentation and analysis using computer-based statistical packages (e.g., SPSS, SYSTAT, BMDP, SAS); application of basic descriptive statistics, correlational and associational measures, and inferential statistics emphasized in a series of analyses of prepared data; description of data sets and preparation of graphic presentations. *(Fall and Spring) (Evenings)*

RSCH 6800. Independent Study in Research (3). Faculty-directed independent study of topics not provided by other research course offerings and/or to examine, extend, and enrich extant research knowledge through supervised individual study. *(On demand)*

RSCH 6890. Special Topics in Research (3). Faculty-directed study and in-depth analysis of a selected area of research. *(On demand)*

Advanced Graduate Only

RSCH 7111/8111. Qualitative Research Methods. (3) Demonstration of historical, philosophical, biographical, ethnographic, and case study methods; location of information sources, application of methods of data collection and analysis, field techniques, and strategies for writing research results. *(Fall, Spring)*

RSCH 7112/8112. Survey Research Methods. (3) Techniques of survey research, including developing proposals, addressing ethical issues, selecting direct and indirect methods, preparing questionnaires, sampling, analyzing and presenting data, writing research reports, extending applications to program evaluation. *(Fall)*

RSCH 7113/8113. Single-Case Research. (3) In-depth study of single-case research methods, including data collection, research designs, data display and analysis, and report writing. *(Spring)*

RSCH 7140/RSCH 8140. Multivariate Statistics. (3) Multiple regression, multivariate analysis of variance, discriminant function analysis, factor analysis, and other multivariate methods applied to descriptive, correlational, and experimental research problems. *(Fall)*

RSCH 7196/8196. Program Evaluation Methods. (3) Examination of principles, strategies, and techniques of program evaluation in order to identify, clarify, and apply defensible criteria that indicate a program's value, quality, utility, effectiveness, and/or significance. *(Spring)*

Doctoral Students Only

RSCH 8110. Descriptive and Inferential Statistics. (3) Identification of objective reporting and decision-making statistics; application of descriptive and inferential methods; illustration of elementary parametric and non-parametric techniques in hypothesis testing; and, demonstration of the fundamentals of data processing. *(Fall)*

RSCH 8120. Advanced Statistics. (3) Application of advanced topics in probability and statistics as a basis for objective decision-making, with emphasis on the following practices through analysis of prepared data: multiple correlation and regression, one-way and n-way

analysis of variance and covariance, advanced ANOVA designs, advanced non-parametric methods, and, selected multivariate statistical procedures. *(Spring)*

RSCH 8130. Presentation and Computer Analysis of Data. (3) Fundamentals of data presentation and analysis using computer-based statistical packages (e.g., SPSS, SYSTAT, BMDP, SAS); application of basic descriptive statistics, correlational and associational measures, and inferential statistics emphasized in a series of analyses of prepared data; description of data sets and preparation of graphic presentations. *(Fall and Spring)*

RSCH 8210. Applied Research Methods. (3) Advanced study of qualitative (e.g., Case Study, Ethnography, Grounded Theory) and quantitative (e.g., Experimental, Single Subject, Descriptive, Correlational, Causal-Comparative) research methods and evaluation research approaches. *(Summer)*

RSCH 8800. Independent Study in Research. (3) Faculty-directed independent study of topics not provided by other research course offerings and/or to examine, extend, and enrich extant research knowledge through supervised individual study. *(On demand)*

RSCH 8890. Special Topics in Research. (3) Faculty-directed study and in-depth analysis of a selected area of research. *(On demand)*

The William States Lee College of Engineering

The William States Lee College of Engineering at the University of North Carolina at Charlotte is known as one of the finest engineering schools in the Southeast. Emphasizing applied research in its educational programs, the college prepares students for careers in engineering through meaningful hands-on involvement and interactive teamwork. Students and faculty work with government, the private sector, and other universities to develop practical advances in technology. Locally and throughout the world, their efforts effect positive economic and environmental change. With cross-disciplinary expertise and capabilities, UNC Charlotte's renowned engineering research centers provide the tools to tackle real-world challenges in a strong academic environment. The Center for Precision Metrology, under the direction of the Mechanical Engineering and Engineering Science Department, helps manufacturers of automobiles, airplanes, and computer chips produce perfect parts through the aid of state-of-the-art measurement systems. The Department's research programs in computational modeling and bioengineering focus on improving the design, control, and manufacturing of engineered and biological systems. Faculty from the Department of Civil Engineering are active participants in the university's Global Institute for Energy and Environmental Systems. Its research focus is the intersection between energy production and the environment. The Department, in conjunction with the Geography and Earth Sciences Department, also assumes a key role in the new Infrastructure and Environmental Systems doctoral program. The Electrical and Computer Engineering Department takes great pride in its research at UNC Charlotte's Optoelectronics and Optical Communications Center. There, researchers exploit the interplay between photons and electrons in quantum confined nanostructures leading to the design, development, and fabrication of next generation optical sources and smart integrated optical devices. The Center for Lean Logistics and Engineered Systems provides industry access to the expertise of the Engineering Management faculty to remain competitive in global markets. These centers and institutes, together with the funded research programs of the faculty, support the graduate programs in Civil, Electrical, and Mechanical Engineering and Engineering Science as well as the Engineering Management program.

Graduate Degree Programs

Master of Engineering
Master of Science in Engineering
Master of Science in Civil Engineering
Master of Science in Electrical Engineering
Master of Science in Engineering Management
Master of Science in Mechanical Engineering
Ph.D. in Electrical Engineering
Ph.D. in Infrastructure and Environmental Systems (with the College of Arts & Sciences)
Ph.D. in Mechanical Engineering

CIVIL ENGINEERING

Department of Civil Engineering

Cameron 136
704-687-2304
http://www.ce.uncc.edu/

Degrees

MSCE, MSE
Ph.D. in Infrastructural and Environmental Systems (with the College of Arts and Sciences)

Graduate Director

Dr. Jy S. Wu

Graduate Faculty

J. Brian Anderson, Ph.D., Assistant Professor
James Bowen, Ph.D., Associate Professor
David M. Boyajian, Ph.D., Assistant Professor
John Daniels, Ph.D., P.E., Assistant Professor
Janos Gergely, Ph.D., P.E., Associate Professor
Johnny Graham, Ph.D., P.E., Professor
Edd Hauser, Ph.D., Professor
Helene Hilger, Ph.D., P.E., Associate Professor
Hilary Inyang, Ph.D., Duke Energy Distinguished Professor
Rajaram Janardhanam, Ph.D., Professor
Martin Kane, Ph.D., P.E., Associate Professor and Undergraduate Director
Vincent Ogunro, Ph.D., Assistant Professor
David Weggel, Ph.D., Assistant Professor
Jy S. Wu, Ph.D., P.E., P.H., Professor and Graduate Director
David Young, Ph.D., P.E., Professor and Chairman

Faculty Emeritus

David Bayer, Ph.D., P.E., Professor Emeritus
Jack Evett, Ph.D., P.E., Professor Emeritus
Ellis King, D. Eng.., P.E., Professor Emeritus

*P.E. = Professional Engineers; P.H. = Professional Hydrologist

PROGRAMS OF STUDY

The Department of Civil Engineering provides opportunities for discipline-specific and multidisciplinary graduate-level education in civil engineering. Advanced course work and research are used to enhance professional development, improve technical competency, and provide a life-long learning experience. The Department offers graduate studies leading to a master's degree (MSCE or MSE) in five areas of concentration: environmental and water resources engineering, geo-environmental engineering, geotechnical engineering, structural engineering and structural materials, and transportation engineering. Doctoral studies leading to the degree of Doctor of Philosophy (Ph.D.) in Infrastructure and Environmental Systems (INES) are available in an interdisciplinary, inter-college program. Doctoral studies leading to the degree of Doctor of Philosophy (Ph.D.) in civil engineering are available through a cooperative arrangement with North Carolina State University (NCSU). The Department also participates in joint MS programs with several international institutions.

PH.D. IN INFRASTRUCTURE AND ENVIRONMENTAL SYSTEMS

See the Inter-College Graduate Programs section of this *Catalog* for details. Contact Prof. David Young (INES Program Director) at dyoung@uncc.edu for admission requirements.

COOPERATIVE PH.D. PROGRAM IN CIVIL ENGINEERING

The College of Engineering at UNC Charlotte has a cooperative arrangement with North Carolina State University (NCSU) to provide Ph.D. degree candidates located in Charlotte and enrolled in the Ph.D. program at NCSU with the opportunity to carry out most of their course work and dissertation research at UNC Charlotte. In addition to courses available at UNC Charlotte, selected doctoral-level courses from other participating institutions are available via the NC-REN telecommunications network. .

Admission requirements to the cooperative Ph.D. program in civil engineering include an earned master's degree in civil engineering or a related field with GPA of 3.5 or better. Acceptance by both UNC Charlotte and NCSU constitute admission to this Ph.D. program. As a cooperative program, the degree of Doctor of Philosophy is awarded by NCSU; however, some course work and dissertation research can be conducted at UNC Charlotte. Consult Prof. Jy S. Wu (NCSU Inter-institutional Adjunct Faculty) at jwu@uncc.edu for additional information

MASTER OF SCIENCE IN CIVIL ENGINEERING (MSCE) AND MASTER OF SCIENCE IN ENGINEERING (MSE)

Admission Requirements

Admission requirements to the master's program include an earned undergraduate degree in civil engineering or a closely related field, an undergraduate GPA of 3.0 or better, a satisfactory score from the Aptitude Portion of the GRE, three letters of recommendation, an acceptable TOEFL score as required by UNC Charlotte for international students, and any other appropriate credentials as required by the Graduate School.

Undergraduate students with outstanding academic performance may be admitted to the Early Entry Program to pursue graduate study while completing the undergraduate degree requirements. Admission to the Early Entry Program requires a minimum GPA of 3.2 and completion of at least 75 hours toward the BSCE degree. Early Entry students may request two graduate CEGR courses to be applied to both their graduate and undergraduate programs (double-counted).

Application Deadline

Applications will be received by the Graduate Admission Office anytime prior to their published deadlines. Students seeking assistantships or tuition grants should apply by February 15. The Department will make the first round of decisions by March 15 for awards of TA's and tuition grants for the following academic year. The Department will evaluate admission applications at any time that the applications are received from the Graduate School.

Assistantships

Research and teaching assistantships are available from the Department on a competitive basis to highly qualified applicants/students.

Tuition Grants

Tuition grants including out-of-state tuition differential waivers and in-state tuition support are available on a competitive basis for both out-of-state and in-state students, respectively.

Degree Requirements

A minimum of 30 approved graduate credit hours is required for graduation. A student may fulfill the 30-hour requirement by pursuing one of the three study options: (a) 24 hours of course work plus 6 hours of thesis, (b) 27 hours of course work plus 3 hours of research project, or (c) 30 hours of course work and a

comprehensive examination. At least half of the semester hours must be in courses numbered 6000 or above.

Admission to Candidacy Requirements
Each student is required to submit a Plan of Study to the Department's Graduate Director by the end of the second semester or before completing 18 hours of graduate credits.

Upon completion of a substantial amount of graduate work and in no case later than two weeks prior to the beginning of the semester in which the student expects to complete all requirements for the degree, the student shall file for Admission to Candidacy.

Application for Degree
Each student should make application for degree prior to graduation.

Transfer Credit
The Department accepts the transfer of two graduate courses (6 credits maximum) taken from another institution or UNC Charlotte prior to admission to the master's program in civil engineering.

Core Courses
See course options for specific tracks.

Electives
Typically, two graduate courses outside CEGR can be incorporated into the 30-hr requirement, although this is not a requirement. Generally, an individual with a non-CEGR background is encouraged to substitute CEGR courses for the "outside-CEGR" electives.

Advising
Each student is supervised by his/her graduate advisor and a Program Committee.

Program Committee
The Program Committee shall consist of at least three graduate faculty members. A graduate faculty from outside the CE department or from outside the student's major area-of-study may serve as a member of the Program Committee. The CE graduate advisor shall chair the committee.

Capstone Experiences
Six graduate credits for thesis, three graduate credits for project, or a comprehensive examination are required as a part of the 30-hour requirement.

Thesis/Project/Comprehensive Examination
Each student choosing the thesis or project option is required to make an oral presentation of his/her thesis or project and defend the thesis or project before his/her committee. Students choosing the all-coursework option should contact the CE department or the Graduate Director for guidelines on the comprehensive examination.

Research Opportunity/Experience
Students in civil engineering enjoy a curriculum with opportunities for interdisciplinary research, study abroad, and active participation in a growing research program. Programs of study can be tailored to suit individual needs and interests. The CE web site (http://www.ce.uncc.edu/) provides current areas of research conducted by the civil engineering faculty.

Track Descriptions

Required/recommended courses for the various tracks in environmental and water resources engineering are:
Water Resources: required core courses include CEGR 5144, CEGR 5145, CEGR 5146, and either CEGR 5236 or CEGR 6147.

Treatment Processes and Technology: required core courses include CEGR 5142, Water Treatment Plant Design, Chemical Fate and Transport, and either CEGR 5143 or Soil and Groundwater Remediation.

Environmental Systems: required core courses include CEGR 5236, CEGR 6141, CEGR 6173, and Chemical Fate and Transport.

Environmental Management: required courses may include Sustainable Design, Natural disasters, Risk and Reliability Analysis, ISO Management Systems, Environmental Impact Assessment, EMGT 6902 or EMGT 6950, and CEGR 5143 or CEGR 5234.

Required core courses in geo-environmental engineering are:
Geo-environmental Engineering: CEGR 5145, Waste Containment Systems, Chemical Fate and Transport, and Soil and Groundwater Remediation.

Required core courses in geotechnical engineering are:
CEGR 5278, CEGR 6268, Experimental Soil Mechanics and one course from CEGR 5145, CEGR 5270, and Deep Foundation Engineering.

Additional recommended courses in geotechnical engineering are:
CEGR 5145, CEGR 5264, CEGR 5270, CEGR 5271, CEGR 5272, CEGR 6252, CEGR 6146, Soil Improvement, Site Characterization, Shallow Foundation Engineering, and Deep Foundation Engineering.

Required courses for either track in structural engineering are:
CEGR 5222, CEGR 5224, CEGR 5226, CEGR 5108, CEGR 6129

Additional recommended courses for the two tracks in structural engineering are:
Structural analysis and design: CEGR 5121, CEGR 5123, CEGR 5124, CEGR 6126, CEGR 6127, CEGR 6128, Forensic Engineering, and Timber Design.

Structural materials: CEGR 6127, MEGR 6141, Composite Materials, and Structural Strengthening

Required core courses for transportation engineering are:
CEGR 5161, CEGR 6161, and one of the following: GEOG 6100, MATH 6107, or MATH 6172.

Note: undergraduate students who take any of the courses listed above, or equivalent material, as part of their undergraduate program need not take the corresponding 5000-level courses. Instead, they may choose other graduate courses as a part of their master's degree plan of study. Courses without designated course numbers are currently being offered as Special Topic classes with appropriate course numbers yet to be provided.

Courses in Civil Engineering

CEGR 5090. Special Topics in Civil Engineering. (1-4) Study of specific new areas emerging in the various fields of civil engineering. May be repeated for credit. *(On demand)*

CEGR 5108. Finite Element Analysis and Applications. (3) Prerequisite: CEGR 4224 or consent of department. Finite element method and its application to engineering problems. Application of displacement method to plane stress, plane strain, plate bending and axisymmetrical bodies. Topics include but are not limited to dynamics, fluid mechanics, and structural mechanics. (Dual-listed with MEGR 5108.) *(Spring)*

CEGR 5121. Prestressed Concrete Design. (3) Prerequisites: CEGR 3225 and CEGR 4224 or consent of the department. Analysis and design of prestressed components and systems, including materials and systems for prestressing, loss of prestress, flexural and shear design in accordance with current building codes, analysis of indeterminate prestressed systems, and control of camber, deflection and cracking. *(Spring) (Alternate years)*

CEGR 5123. Bridge Design. (3) Prerequisites: CEGR 3221 and CEGR 3225, or consent of the department. Review of bridge design codes and loadings; superstructure and substructure design of short, intermediate, and long span bridges constructed of steel and concrete; earthquake design; segmental and cable-stayed bridges. *(Spring) (Alternate years)*

CEGR 5124. Masonry Design. (3) Prerequisites: CEGR 3225 or consent of the department. Introduction of masonry materials and engineering and materials properties and testing procedures. Design of reinforced and unreinforced masonry (clay and concrete) walls, beams, and columns for vertical, wind, and seismic loads. Analysis and design of masonry structures (including torsion) and introduction to computer applications. *(Spring) (Alternate years)*

CEGR 5128. Matrix Methods of Structural Analysis. (3) Prerequisite: consent of department. Derivation of the basic equations governing linear structural systems. Application of stiffness and flexibility methods to trusses and frames. Solution techniques utilizing digital computer. *(Fall) (Alternate years)*

CEGR 5141. Process Engineering. (3) Prerequisite: CEGR 3141 or consent of the department. Applications of material and energy balance principles to the study of chemical, biological and environmental engineering processes. Overview of applied biotechnology, engineering thermodynamics and kinetics. *(Fall)*

CEGR 5142. Water/Wastewater Engineering. (3) Prerequisite: CEGR 3141or consent of the department. Analysis and design of water and wastewater treatment processes including: physical, chemical and biological treatment. Computer-aided design of treatment systems. *(Spring)*

CEGR 5143. Solid Waste Management. (3) Prerequisite: CEGR 3141 or consent of the department. Solid waste management, sources, generation rates, processing and handling, disposal, recycling, landfill closures, and remedial actions for abandoned waste sites. *(Spring) (Alternate years)*

CEGR 5144. Engineering Hydrology. (3) Prerequisite: consent of the department. A quantitative study of the various components of the water cycle, including precipitation, runoff, ground water flow, evaporation and transpiration, stream flow. Hydrograph analysis, flood routing, frequency and duration, reservoir design, computer applications. *(On demand)*

CEGR 5145. Groundwater Resources Engineering. (3) Prerequisite: CEGR 3141 or consent of the department. Overview of hydrological cycle. Principles of groundwater flow and well hydraulics. Regional groundwater flow and flow nets. Water chemistry and contamination. Applications of groundwater modeling. *(Fall) (Alternate years)*

CEGR 5146. Advanced Engineering Hydraulics. (3) Prerequisite: CEGR 3143 or consent of the department. Problems of liquids as applied in civil engineering; open channel flow; dams and spillways; water power; river flow and backwater curves; pipe networks, fire flow, sewage

collection, groundwater, computer applications. *(On demand)*

CEGR 5161. Advanced Traffic Engineering. (3) Prerequisite: CEGR 3161 or consent of the department. Analysis of basic characteristics of drivers, vehicles and roadway that affect the performance of road systems. Stream flow elements, volume, density, speed. Techniques of traffic engineering measurements, investigations and data analysis, capacity analysis. Intersections, accidents, parking. *(On demand)*

CEGR 5162. Transportation Planning. (3) Prerequisite: CEGR 3161 or consent of the department. Urban transportation; travel characteristics of urban transportation systems; analysis of transportation-oriented studies; analytic methods of traffic generation, distribution, modal split and assignment; traffic flow theory. *(On demand)*

CEGR 5171. Urban Public Transportation. (3) Prerequisite: CEGR 3161 or consent of the department. Planning, design, and operation of bus, rail, and other public modes. Relationship between particular modes and characteristics of urban areas. Funding, security and other administrative issues. *(Fall) (Alternate years)*

CEGR 5181. Human Factors in Traffic Engineering. (3) Prerequisite: CEGR 3161 or consent of the department. Study of the driver's and pedestrian's relationship with the traffic system, including roadway, vehicle and environment. Consideration of the driving task, driver and pedestrian characteristics, performance and limitations with regard to traffic facility design and operation. *(On demand)*

CEGR 5182. Transportation Environmental Assessment. (3) A study of the environmental impact analysis and assessment procedures for transportation improvements. Route location decisions. Noise, air quality, socio-economic, and other impacts. *(On demand)*

CEGR 5183. Traffic Engineering Studies. (3) Prerequisite: CEGR 3161 or consent of department. Introduction to the traffic engineering studies most used by traffic engineers including data collection techniques, statistical analysis procedures, report writing and presentation. One hour of lecture and three hours of laboratory per week. *(On demand)*

CEGR 5184. Highway Safety. (3) Prerequisite: CEGR 3161 or consent of the department. Engineering responses at the state and local levels to the problem of highway safety. Extent of the highway safety problem, elements of traffic accidents, common accident countermeasures, collection and analysis of accident data, evaluation of safety-related projects and programs, and litigation issues. *(Fall) (Alternate years)*

CEGR 5185. Geometric Design of Highways. (3) Prerequisite: CEGR 3152 or consent of the department. Theory and practice of geometric design of highways including intersections, interchanges, parking and drainage facilities. Driver ability, vehicle performance, safety and economics are considered. Two hours of lecture and three laboratory hours per week. *(On demand)*

CEGR 5222. Structural Steel Design II. (3) Prerequisite: CEGR 3221 or consent of department. Analysis and design of structural steel components and systems with emphasis on theories necessary for a thorough understanding of the design of complete structures. Compression members affected by local buckling, beams with lateral-torsional buckling, continuous beams and beam columns are covered. Welded and bolted connections. Current AISC Specifications used. *(Spring)*

CEGR 5224. Advanced Structural Analysis. (3) Prerequisite: CEGR 3122 or consent of the department. A continuation of CEGR 3122. Methods to determine deflections in structural members, including moment area, conjugate beam, virtual work, and Castigliano's theorem. Analyze statically indeterminate structures, including approximate method, slope deflection, moment distribution, and matrix stiffness methods. Project to compare analysis techniques and introduce use of structural analysis computer programs. *(Fall)*

CEGR 5226. Reinforced Concrete Design II. (3) Prerequisite: CEGR 3225 or consent of the department. Analysis and design of reinforced concrete components and systems with emphasis on the fundamental theories necessary for a thorough understanding of concrete structures. Concentrically loaded slender columns, slender columns under compression plus bending. Wall footings and column footings. Analysis of continuous beams and frames. Total design project involving the analysis and design of a concrete structure. Current ACI Specifications used. *(Spring)*

CEGR 5234. Hazardous Waste Management. (3) Prerequisite: CEGR 3141 or consent of the department. Integration of scientific and engineering principles with legislation, regulation and technology in the management of hazardous wastes. Study of thermal, chemical, physical and biological systems and processes used in the treatment of hazardous wastes and the remediation of hazardous waste sites. *(On demand)*

CEGR 5235. Industrial Pollution Control. (3) Prerequisite: consent of the department. Source and characterization of industrial wastewaters. Fundamentals of chemical and physical treatment processes. Biological treatment technologies. Waste minimization and reduction technologies. Sludge handling and toxicity reduction. Implementation of field or laboratory treatability study. *(Fall) (Alternate years)*

CEGR 5236. Watershed Analysis. (3) Prerequisite: consent of the department. Study of NPS problems in urban and non-urban watersheds and from highway runoff. Estimate of sediment yield and design of BMP's including sediment control structures. Introduction to monitoring and modeling of hydrologic systems. Watershed modeling in a GIS environment. *(Spring) (Alternate years)*

CEGR 5237. Environmental Risk Management. (3) Prerequisite: consent of the department. Review of legislation and requirements pertaining to spills and releases of chemicals to the environment. Fundamentals of fires, explosions, toxic emissions and dispersion, hazardous spills, and other accidents. Study of techniques for accident prevention and spill control, and hazardous and risk assessment. *(Fall) (Alternate years)*

CEGR 5241. Chemical Processes in Water and Wastewater Treatment. (3) Prerequisites: CHEM 1252 (Formerly CHEM 1102) and CEGR 3141, or consent of the department. Chemical principles involved in the treatment of water and wastewaters; principles of chemical equilibrium relevant to natural water systems; the nature and effect of chemical interactions of domestic and industrial waste effluents on natural water systems. (*On demand*)

CEGR 5243. Topics in Environmental Health. (3) Prerequisites: CEGR 3141 and CEGR 4142, or consent of the department. Study of contemporary environmental health problems and practices as they relate to groundwater pollution, food and water-borne diseases, radiological health, occupational health and risk assessment. Provides an introduction to epidemiology and toxicology, and a historical review of federal environmental policy and legislative action. (*On demand*)

CEGR 5262. Traffic Engineering. (3) Prerequisite: CEGR 3161 or consent of the department. Operation and management of street and highway systems. Traffic control systems, traffic flow theory, and highway capacity. Evaluation of traffic engineering alternatives and the conduct of traffic engineering studies. *(Spring)*

CEGR 5264. Landfill Design and Site Remediation. (3) Prerequisites: CEGR 3258 and CEGR 3278, or consent of the department. Principles of waste disposal and sanitary landfill siting including design, construction, operation and maintenance. Site assessment of underground storage tank leaks; site remediation, and clean up technologies using choice and economic analysis and computer applications. *(Spring) (Alternate years)*

CEGR 5270. Earth Pressures and Retaining Structures. (3) Prerequisites: CEGR 3122 and CEGR 3278 or consent of the department. Earth pressure theories, effects of wall friction and external loads (including earthquake); design of rigid retaining walls (including structural details); sheetpile wall design; soil reinforcement systems for retaining structures; computer applications. (*On demand*)

CEGR 5271. Pavement Design. (3) Prerequisites: CEGR 3161 and CEGR 3278, or consent of the department. Pavement design concepts and considerations; engineering properties of pavement materials including soils, bases, asphalt concrete, and Portland cement concrete; design of flexible and rigid pavements including shoulders and drainage; computer applications for pavement analysis and design. (*On demand*)

CEGR 5272. Design with Geosynthetics. (3) Prerequisites: CEGR 3258 and CEGR 3278 or consent of the department. Types and properties of geosynthetics. Designing with geosynthetics for filtration, separation, drainage, soil reinforcement, stabilization, containment, and erosion control. Computer applications in design. *(Fall) (Alternate years)*

CEGR 5278. Geotechnical Engineering II. (3) Prerequisites: CEGR 3258 and CEGR 3278, or consent of the department. Design of shallow and deep foundations, including structural considerations; lateral earth pressure theories; design of rigid and flexible earth retaining structures; advanced aspects of slope stability analysis; and computer applications. (*Fall*)

CEGR 5892. Individualized Study and Projects. (1-6) Prerequisites: consent of the department. Individual investigation and exposition of results. May be repeated for credit. (*On demand*)

CEGR 5991. Graduate Research in Civil Engineering. (1-6) Prerequisite: consent of the department. Independent study of a theoretical and/or experimental problem in a specialized area of civil engineering. May be repeated for credit. *(On demand)*

CEGR 6090. Special Topics in Civil Engineering. (1-6) Directed study of current topics of special interest. May be repeated for credit. *(On demand)*

CEGR 6122. Advanced Topics in Structural Steel. (3) Prerequisite: CEGR 4222 or consent of the department. Theory of plastic-behavior of steel structures; current topics in structural steel. *(On demand)*

CEGR 6126. Analysis of Plates and Shells. (3) Prerequisite: CEGR 4224, or consent of the department. Analysis of rectangular and circular plates using classical as well as numerical methods; orthotropic and continuous plates and plate buckling. Analysis of thin shells and shells of revolution with and without bending; membrane theory of cylindrical shells; symmetric and unsymmetric loading; pipes, tanks, and pressure vessels; computer applications. *(On demand)*

CEGR 6127. Fracture Mechanics and Fatigue. (3) Prerequisite: CEGR 3221 or consent of the department. Introduction to fracture mechanics and fatigue, including Griffith Theory, plane strain-stress conditions, critical stress intensity factors, factors influencing fracture toughness, fracture mechanics design principles, fatigue performance, and fatigue initiation and propagation. *(On demand)*

CEGR 6128. Structural Optimization. (3) **Prerequisite**: CEGR 4224, or consent of the department. Introduction to optimization concepts; reformulation of common structural analysis and design problems to an optimization format; optimization of constrained, unconstrained, linear, and nonlinear problems by classical and numerical techniques; and computer applications. *(On demand)*

CEGR 6129. Structural Dynamics. (3) Prerequisite: CEGR 3122 or consent of the department. Methods for dynamic analysis of single and multiple degree of freedom systems. Topics include free vibrations, dynamic response of simple structures under time dependent loads (e.g., harmonic, periodic, impulsive, general dynamic loading), support motion, frequency domain analysis, response spectra, earthquake engineering. *(On demand)*

CEGR 6141. Water Quality Modeling. (3) Prerequisite: consent of the department. Mathematical modeling of water quality in receiving streams including: generation of point and nonpoint sources of pollution; formulation of transport equations for contaminants in stream and estuarine water; and prediction of the fate, persistence and transformation of chemical pollutants in aquatic ecosystems. Computer model simulation and case studies. *(On demand)*

CEGR 6142. Bioenvironmental Engineering. (3) Prerequisite: CEGR 3141 or consent of the department. Theoretical principles and design of aerobic and anaerobic biological unit processes for renovating waters and wastewaters. Activated sludge, aerated and facultative lagoons, rotating biological contractors, trickling and anaerobic filters. *(On demand)*

CEGR 6143. Bioprocess Technology. (3) Prerequisites: CEGR 4141 and general microbiology, or consent of the department. Introduction to metabolic pathways, growth kinetics and reactor theories. Laboratory investigation of the operation, optimization and scale-up problems associated with batch and continuous culture of microorganisms. Process analysis and modeling of environmental engineering processes. *(Spring)*

CEGR 6144. Environmental Biotechnology. (3) Prerequisite: consent of the department. Application of biotechnology to the management of environmental problems. Study of bioprocess principles, bioremediation of waste disposal sites, cell immobilization technology and innovative biotechnologies. *(On demand)*

CEGR 6145. Waste Incineration. (3) Prerequisite: consent of the department. Fundamentals of incineration of hazardous/solid wastes. Thermochemical applications and equipment design. Computer modeling of the incineration process and air quality control. *(Spring)*

CEGR 6146. Advanced Groundwater Analysis. (3) Prerequisite: consent of the department. Modeling of groundwater flow in saturated and unsaturated zones. Contaminant transport including advection, dispersion and numerical modeling. Groundwater remediation technology. *(On demand)*

CEGR 6147. Storm Water Modeling. (3) Prerequisite: consent of the department. Characterization of non point source pollution; modeling of flow and pollutant transport in storm runoff; application of U.S. EPA Stormwater Management Model and U.S. Soil Conservation Service Models. *(On demand)*

CEGR 6148. Water Conservation. (3) Prerequisites: consent of the department. Principles and issues concerning water conservation and methods for effecting water conservation, including residential, industrial, commercial, and agricultural water conservation; water rates, audits and reuse/reclamation as they relate to water conservation; and case studies. *(On demand)*

CEGR 6161. Traffic Control and Operation. (3) Prerequisite: CEGR 5161 or consent of the department. Traffic control theory and application; traffic regulation, laws and ordinances; speed control, intersection control, flow control and parking control; design and application of control devices, investigation, evaluation techniques; statistical analysis; administration. (*On demand*)

CEGR 6165. Urban Systems Engineering. (3) Prerequisite: CEGR 3202 or consent of the department. Survey of economic, political, sociological and technological factors affecting modern growth; a planning process and its role in solving selected urban problems with emphasis on engineering contributions. *(On demand)*

CEGR 6171. Air Quality Control. (3) Prerequisite: consent of the department. Study of various types of air pollutants, their sources, nature and effects. Examination of air quality criteria, standards and monitoring. Analysis of feasibility, applicability and efficiency of diverse systems of control. Evaluation of goal and research needs in the future. *(On demand)*

CEGR 6172. Air Dispersion Modeling. (3) Prerequisites: consent of the department. Atmospheric pollution problems, federal regulations, boundary layer meteorology, dispersion theory, Gaussian model, plume rise formulas, air toxics, and computer modeling of point area, line and mobile sources. *(On demand)*

CEGR 6173. Environmental Aquatic Chemistry. (3) Prerequisite: CHEM 3111 or CHEM 3141, or equivalent, or consent of the department. Concepts of chemical equilibrium applied to natural aquatic systems. Topics include acid-base reactions, buffer systems, mineral precipitation, coordinate chemistry, redox reactions, adsorption phenomena and chemical-equilibria computer programs. *(Spring) (Alternate years)*

CEGR 6181. Traffic Flow Theory. (3) Prerequisite: CEGR 5161 or consent of the department. Logical foundations and mathematical representation of traffic flow; interrelation between microscopic and macroscopic equations of motion for highway traffic; stochastic properties of traffic at low and moderate densities. Car-following theories of traffic flow at high densities. Applications of queuing theory. *(On demand)*

CEGR 6182. Transportation Systems Analysis. (3) Prerequisite: CEGR 5161 or consent of the department. Issues, concepts and methods of transportation systems engineering and planning. Decision making in transportation management. The application of analytical methods to the development and evaluation of transport systems. *(On demand)*

CEGR 6252. Soil Dynamics and Earthquake Engineering. (3) Prerequisites: CEGR 3122 and CEGR 3278, or consent of department. Review of the dynamics of single and multi degree of freedom systems. Earthquake mechanism, distribution, magnitude, intensity, ground shaking, site effects, prediction, and response spectra. Soil liquefaction; aseismic design of foundations; seismic codes; and machine foundation design. (*On demand*)

CEGR 6261. Traffic Signal Control Systems. (3) Prerequisite: CEGR 6161 or consent of the department. Study of control systems for isolated intersections, arterial streets, closed networks, and freeways. Emphasis on computer models; state-of-the-art detection, control, and communications equipment and software; and intelligent vehicle/highway systems. (*Fall*)

CEGR 6268. Advanced Soil Mechanics. (3) Prerequisites: CEGR 3258 and CEGR 3278, or consent of the department. One and two-dimensional consolidation, layered strata effects, and creep; seepage in layered strata, flow net, and seepage forces; shear strength parameters, effective and total stress paths, and application for slope stability evaluation; principles of critical state soil mechanics; computer applications. (*On demand*)

CEGR 6892. Individualized Study and Projects. (1-6) Individual investigation and exposition of results. May be repeated for credit. *(On demand)*

CEGR 6990. Industrial Internship. (1-3) Prerequisite: Completion of nine hours of graduate coursework. Full- or part-time academic year internship in engineering complementary to the major course of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by their graduate program director. Requires a mid-term report and final report to be graded by the supervising faculty. (on demand). Grading shall be designated as "Pass/Unsatisfactory" and credit hours gained from Internship shall not be part of the minimum credit hours requirement for graduation.

CEGR 6991. Graduate Master Thesis Research. (1-6) Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit. *(On demand)*

CEGR 7999. Master's Degree Thesis Residence. (1) Required for continuing registration and enrollment while completing thesis or research project. May be repeated. *(On demand)*

CEGR 8090. Special Topics. Directed study of current topics of special interest. (see the INES Program in the Inter-College Graduate Programs Section of this *Catalog* for details.)

ELECTRICAL ENGINEERING

Department of Electrical and Computer Engineering

332 Smith Building
(704) 687-2302
http://www.ece.uncc.edu

Degrees

M.S.E.E., M.S.E. and Ph.D.

Director

Dr. Kasra Daneshvar

Graduate Faculty

Lee Casperson, Professor and chairman
David Binkley, Associate Professor
Steve Bobbio, Professor
James Conrad, Associate Professor
Kasra Daneshvar, Professor
John M. Emmert, Associate Professor
Michael Fiddy, Professor
Mohamed-Ali Hasan, Associate Professor
Ivan Howitt, Associate Professor
Yogendra P. Kakad, Professor
Vasilije Lukic, Professor
Rafic Makki, Professor (on leave)
Mehdi Miri, Associate Professor

Arindam Mukherjee, Assistant Professor
Asis Nasipuri, Assistant Professor
Arun Ravindran, Assistant Professor
Ed Stokes, Associate Professor
Farid Tranjan, Professor
Raphael Tsu, Professor
Tom Weldon, Associate Professor
Howard Phillips, Professor (Emeritus)
Richard Green, Professor (Emeritus)
William A. Smith, Associate professor (Emeritus)

The Department of Electrical and Computer Engineering offers multidisciplinary programs leading to M.S. and Ph.D. degrees in Electrical Engineering. The department offers a first class education to its students which prepare them for positions in industry or academia. Our students are provided with both breadth of knowledge in Electrical and Computer Engineering and related areas and depth of knowledge in the chosen research specialty. The department is staffed with a prestigious faculty conducting research in areas ranging from control systems to optoelectronics. A full range of state-of-the-art laboratories is available enabling faculty and students to conduct research at the cutting edge of technology.

MASTERS PROGRAMS IN ELECTRICAL ENGINEERING

The Masters programs are designed to provide technical expertise in a specific area of electrical and computer engineering as well as breadth of knowledge in supporting areas. The thesis option provides the students the opportunity to work on a research project that culminates in the publishing of a thesis. The non-thesis option is designed to provide additional breadth in areas that support the chosen focus area. It is also the goal of the program to graduate engineers with effective problem solving and communication skills.

M.S.E.E. Degree Requirements

The M.S.E.E degree is awarded to those students who complete the M.S. program of the Department of Electrical and Computer Engineering. Students admitted to the M.S. program who do not have a B.S. degree in electrical or computer engineering or related field, may need to take undergraduate preparatory courses in order to succeed in their graduate studies.

Thesis

Both thesis and non-thesis options exist.

Degree Requirements for the Thesis Option

1) Plan of Study - the student must meet with his/her advisor to formulate a plan of study. The plan of study must be submitted after completing at least 9 but no more than 18 semester credits.
2) Satisfactory completion of 30 hours of approved graduate credits in major or related area of study including from 6-9 hours of thesis.
3) Admission to candidacy - the admission to candidacy form must be completed prior to the thesis defense. The student should consult the schedule of classes for deadlines on submitting this form for Fall or Spring graduation.
4) Thesis Defense - a copy of the thesis should be distributed to each member of the program committee at least one week prior to the defense.

Degree Requirements for the Non-Thesis Option

1) Plan of Study - the student must meet with his/her advisor to formulate a plan of study. The plan of study must be submitted after completing at least 9 but no more than 18 semester credits.
2) Satisfactory completion of 30 hours of approved graduate credits. This includes 21 hours of courses in the major (at least 15 of which must be in the ECE department).
3) Essay - this can take several forms. For example, it could be a survey of a number of research papers, a report on a small development project that the student undertakes, etc. The essay topic will be assigned by the advisor. The final written report will be approved by the student's advisory committee (a majority of the committee members) via signatures of the committee members on the report.
4) Admission to candidacy - the admission to candidacy form must be completed prior to the oral exam. The student should consult the schedule of classes for deadlines on submitting this form for Fall or Spring graduation.
5) Oral Exam - this will be administered by the program advisory committee.

Program Committee

The program committee is composed of at least 3 members of the graduate faculty, the majority of whom must be members of the Electrical and Computer Engineering department. The graduate program advisor generally serves as the chairman of the committee.

PH.D. IN ELECTRICAL ENGINEERING

The Ph.D. program is designed to provide the students with research-level expertise in a focus area within electrical and computer engineering and breadth of knowledge in areas related to the focus area. It is also designed to graduate scientists that can effectively articulate their ideas, publish their research and obtain funding for their programs and ideas. To that end, we place value on the big-picture perspective of electrical and computer engineering.

Degree Requirements

The following is a chronologically ordered set of requirements for the Ph.D. degree in Electrical Engineering:

1) Appointment of a Ph.D. advisor and formation of an advisory committee.
2) Development of a Ph.D. Plan of Study detailing all course and examination requirements.
3) Successful completion of the written qualifying examination.
4) Presentation of a proposal for Ph.D. research and admission to candidacy.
5) Successful defense of the Ph.D. Dissertation.

Within the first semester of being admitted into a Ph.D. program, the student should choose a Ph.D. adviser and form an advisory committee. In conjunction with the Ph.D. adviser and this advisory committee, the student will develop a Plan of Study to meet the Ph.D. program requirements of course work and examinations and prepare to undertake original research leading to a dissertation of a quality that would be acceptable for publication of articles in peer-refereed professional journals.

Plan of Study

The Plan of Study must be submitted to the Chair of the Department for review and approval within the second semester after admission to the Ph.D. program. The Plan of Study must show a minimum of 72 hours of credit beyond the Baccalaureate degree, including at least 45 hours of formal course work beyond the baccalaureate degree and at least 18 hours of research/ dissertation credits (beyond the M.S. thesis credits). For students who do not possess appropriate bachelor's and/or master's degrees in engineering, additional course work will be expected.

Course Requirements

The specific course requirements will be set by the student's Advisory Committee and must include:

1) At least 30 hours within the major field of study, no less than 18 of which must be in courses at the 8000-level, open only to Ph.D. students.
2) Two minors consisting of at least 6 hours each in related fields of study.
3) Graduate Only Courses. At least 18 hours in the major field must be in courses at the 8000-level. At least 12 of those hours must be taken after admission to the Ph.D. program.

Grades

A student is expected to achieve A's or B's in all course work taken for graduate credit and must have a GPA of at least a 3.0 in order to graduate. The dissertation is graded on a Pass/ Unsatisfactory basis and, therefore, will not be included in the cumulative average. An accumulation of more than two marginal (C) grades will result in suspension of the student's enrollment in the graduate program. If a student makes a grade of U on any course, enrollment will be suspended. A graduate student whose enrollment has been suspended because of grades is ineligible to attend any semester or summer session unless properly readmitted to the graduate program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the student's major department and the Engineering Doctoral Graduate Committee of the College of Engineering.

Residence

A student may satisfy the residency requirement for the program by completing 18 hours, either course work or research credits, by study-in-residence during the academic year and during the summer terms, as long as the study is continuous. Study-in-residence is deemed to be continuous if the student is enrolled in one or more courses (including research/dissertation credit) in successive semesters until eighteen hours of credit are earned.

Qualifying Examination

In addition to demonstrating a high level of competence in course work, the student must pass a comprehensive written qualifying examination in the major and minor areas. The qualifying examination should be taken before completion of 18 hours beyond the master's degree in the major and minor areas but must be passed no later than one year after initial admission to the program. Failure to pass the qualifying examination in two tries will result in the termination of the student's enrollment in the Ph.D. program.

Ph.D. Qualifying Examination Format

The qualifying exam is divided into two test sessions. The first session covers primarily senior level undergraduate courses, and the second session covers primarily first-year graduate courses in ECE. In each session, the student chooses four problems only from a set of problems covering different areas. Problems can be selected from a given area. For a detailed listing of courses, areas, and procedures please refer to ECE graduate hand book, contact ECE department, or go to ECE Department Web. at http://www.uncc.edu

Dissertation Proposal and Admission to Candidacy

Because the Ph.D. program is heavily based on independent research, each student must write a proposal describing his/her proposed dissertation research following the technical guidelines established by the department. The proposal must be presented to and orally defended before the student's advisory committee. The proposal must be presented within one year after the qualifying examination is passed. Upon approval of the student's dissertation proposal, the advisory committee will recommend the student's admission to candidacy subject to the approval of the engineering Doctoral

Graduate Committee and the Dean of the Graduate School.

Dissertation

Evidence of a high degree of competence in scholarship, written exposition, independent inquiry and the ability to organize and apply knowledge must be demonstrated by the student in the dissertation. The student will make a public defense of the dissertation at which time the dissertation, as well as the student's knowledge of the field, will be appropriate matter for examination by the student's advisory committee. Although questions may be asked by the general audience, evaluation of the dissertation defense is the sole responsibility of the advisory committee. The dissertation will be graded on a Pass/Unsatisfactory basis.

Research Tool Requirements

Each student is expected to develop working knowledge of the library tools used in literature search and review in the major field of concentration. This would include familiarity with at least one of the computer-based databases available at UNC Charlotte. In addition, each student is expected to have a working knowledge of at least one computer language appropriate for the field of inquiry. The student will have a working knowledge of appropriate major software packages and will have the ability to develop original software as needed.

Time Limit

Students are allowed a maximum of eight (8) calendar years from formal admission to the Ph.D. program to complete the program successfully.

Tuition Waivers

For exceptionally qualified candidates who receive TAs and RAs, in state tuition and out-of-state tuition differential waivers are available.

Assistantships

There are two forms of assistantships that are offered by the ECE Department. These are Teaching Assistantships (TAs) and Research Assistantships (RAs). RAs are controlled by faculty members with research grants, and the faculty members make the decisions in selecting students for RAs. Therefore, for RAs, students should contact individual faculty members directly. TAs are given to students to help faculty members with classroom teaching or laboratory instruction and these allocations are related to the ECE department needs and available resources. In all cases, the TAs and RAs are awarded to exceptional students. Application forms are available on the ECE and Graduate School Web sites.

Courses In Electrical And Computer Engineering

ECGR 5101. Advanced Computer Utilization. (3) Prerequisite: consent of department. The use of computers in large scale engineering problems. Topics include flow diagrams, matrix analysis of systems, applications of iteration methods to non-linear problems, eigen-value problems, optimization and handling of large engineering database problems. Engineering applications will be emphasized. Credit will not be given for ECGR 5101 where credit has been given for ECGR 4101. *(On demand)*

ECGR 5102. Engineering Simulation. (3) Prerequisite: ECGR 2103 or consent of department. A wide range of simulation related topics will be introduced including the theory of simulation, characteristics of simulators, and trade-offs in simulation studies. Continuous and discrete simulation with primary emphasis on application of simulation techniques to engineering problems. Simulation of actual problems based on students' interest and experience areas. Credit will not be given for ECGR 5102 where credit has been given for ECGR 4102. *(On demand)*

ECGR 5103. Applied Computer Graphics. (3) Prerequisite: permission of department. Interactive graphics; raster, character, vector, graphics, display technologies; rotation, scaling, translating of graphics image; image processing/enhancement; feature extraction; 3-D graphics; hidden lines. Credit will not be given for ECGR 5103 where credit has been given for ECGR 4103. *(On demand)*

ECGR 5104. Computational Methods in Power Systems. (3) Prerequisite: ECGR 4142 or consent of department. Numerical techniques for analysis, operation and planning of power systems. Sparse matrix techniques applied to power flow algorithms. Economic operation of power systems. Optimum power flow. Credit will not be given for ECGR 5104 where credit has been given for ECGR 4104. *(On demand)*

ECGR 5113. Network Synthesis. (3) Prerequisite: ECGR 4114. The positive real concept, properties and methods of testing. Realizability conditions on driving point functions. Methods of synthesis of one-port. Physical realizability and properties of two-port networks. Transfer function synthesis. Approximation methods. Credit will not be given for ECGR 5113 where credit has been given for ECGR 4183. *(On demand)*

ECGR 5114. Device Characterization, Parameterization and Modeling. (3) Prerequisite: ECGR 3132 and ESGR 4134 or permission of department. Advance device and circuit analysis; device and circuit simulation using SPICE, ECAP or equivalent. Parametric modeling of active devices. Device characterization and parameterization; temperature

effects; thermal cycling. Analysis of device failure modes. Credit will not be given for ECGR 5114 where credit has been given for ECGR 4184. *(On demand)*

ECGR 5121. Antennas. (3) Prerequisite: ECGR 3122 with a grade of C or better or permission of the department. Radiation into free space, the point source, thin linear antenna, arrays of linear elements, aperture antennas, impedance, methods of feeding, matching and termination. Antenna systems. Credit will not be given for ECGR 5121 where credit has been given for ECGR 4121. *(On demand)*

ECGR 5122. Random Processes and Optimum Filtering. (3) Prerequisites: ECGR 3111 and STAT 3228 or permission of department. Review of probability, univariate and multivariate distribution functions; random processes, discrete and continuous time precesses, widesense stationary, ergodicity; time-and frequency-domain analysis; linear systems, optimum filtering, Wiener filters, Kalman filters; application. Credit will not be given for ECGR 5122 where credit has been given for ECGR 4422. *(Spring)*

ECGR 5123. Advanced Electromagnetic Field Theory. (3) Prerequisite: ECGR 3122 or permission of department. Maxwell's equations and propagation. Properties of guided and surface waves. Wave properties of light; physical and fiber optics. Credit will not be given for ECGR 5123 where credit has been given for ECGR 4185. *(On demand)*

ECGR 5124. Digital Signal Processing. (3) Prerequisite: EEGR 3112 with a grade of C or better. Sampling and signal recovery in linear systems; analysis of sampled systems; discrete and fast Fourier transforms; z-transform; discrete convolution; design of digital FIR and IIR filters. Credit will not be given for ECGR 5124 where credit has been given for ECGR 4124. *(Spring)*

ECGR 5125. Foundations of Optical Engineering I. (3) Prerequisites: ECGR 3121 (Electromagnetic Fields) and PHYS 3141 (Modern Physics) with a grade of C or better or permission of the Department. The engineering aspects and applications of modern optics, optical communications, optical materials, optical devices, basic optical fiber and integrated optics, optical signals, and optical modulation, multiplexing , and related networks, basic Fourier optics and its application in optical images and information. Credit will not be given for ECGR 5125 where credit has been given for ECGR 4125. *(Fall)*

ECGR 5132. Advanced Analog Integrated Circuit Electronics. (3) Prerequisite: permission of department. Topics include analog amplifier design, layout and simulation of analog circuits, active filters, analog processing, process control, electronic power supplies, reliability, noise and low-level signal processing. Credit will not be given for ECGR 5132 where credit has been given for ECGR 4132. *(On demand)*

ECGR 5133. VLSI Systems Design. (3) Prerequisite: ECGR 2181 and 3131 or permission of department. Analysis, design, and synthesis of very large scale integrated circuits. A project-oriented course relying heavily on computer-aided design tools for logic, layout design, and simulation. Credit will not be given for ECGR 5133 where credit has been given for ECGR 4433. *(Fall) (Evenings)*

ECGR 5134. Advanced VLSI Systems Design. (3) Prerequisite: ECGR 5133. A project-oriented course dealing with advanced topics in VLSI systems design and analysis such as circuit design techniques, array structures, performance estimation, automated routing and device electronics. Credit will not be given for ECGR 5134 where credit has been given for ECGR 4188. *(Spring)*

ECGR 5135. Physical Electronics. (3) Prerequisite: ECGR 3122 or PHYS 3181 or permission of department. Dynamics of charged particles; electron motion in electromagnetic fields; types of electron emission; beam focusing; longitudinal and transverse beam waves; microwave generation; plasma parameters. Credit will not be given for ECGR 5135 where credit has been given for ECGR 4135. *(On demand)*

ECGR 5137. Device Electronics for Integrated Circuits. (3) Prerequisites: ECGR 3132 and ECGR 4134, or permission of department. The basic operating principles of electronic devices in integrated circuits are treated. The physical models of these devices are discussed. Graduate students are required to carry out laboratory experimentation. Credit will not be given for ECGR 5137 where credit has been given for ECGR 4137. *(Fall) (Evenings)*

ECGR 5138. Electronic Thin Film Materials and Devices. (3) Prerequisite: ECGR 4133 or 3132, or permission of the department. Applications of thin films in microelectronics/optoelectronics manufacturing processes; vacuum technology, deposition techniques, and the characterization methods relevant to optoelectronic applications; thin film applications such as metallization, silicide formation, light emitting diodes (LED) and lasers, and doping of semiconductors. Credit will not be given for ECGR 5138 where credit has been given for ECGR 4138. *(Fall)*

ECGR 5139. Digital Communication Systems. (3) Prerequisites: ECGR 2181 and 3131. Topics include digital data transmission systems, signal and system representation, digital system performance characterization, pulse code modulation, and statistical communications theory. Credit will not be given for ECGR 5139 where credit has been given for ECGR 4139. *(On demand)*

ECGR 5140. Introduction to VLSI Processing. (3) Prerequisite: permission of the department.

Microelectronic fabrication; relevant materials, processes, and tools; fabrication of a simple structure in the VLSI clean room/lab. Credit will not be given for ECGR 5140 where credit has been given for ECGR 4140. *(Fall)*

ECGR 5142. Power Generation: Operation and Control. (3) Prerequisite: ECGR 4142 or consent of department. Characteristics of power generation units, steam, nuclear reactor and hydroelectric. Economic and thermal system dispatch. Transmission losses, load flow problems. Hydro scheduling, hydro-plant models. Energy production cost models. Interchange evaluation. Credit will not be given for ECGR 5142 where credit has been given for ECGR 4190. (Fall) (Alternate years) *(Evenings)*

ECGR 5143. Dynamic and Transient Analysis of Power Systems. (3) Prerequisite: ECGR 4142 or permission of department. Large-scale systems state descriptions and hierarchical control. State space models, dynamic stability and testing. Stability of simple and multi-machine systems. Transient phenomena in electrical power systems. Transient stability problem. Credit will not be given for ECGR 5143 where credit has been given for ECGR 4191. *(Spring) (Alternate years) (Evenings)*

ECGR 5146. Introduction to VHDL. (3) Prerequisites: ECGR 2182 and knowledge of a computer language, or permission of department. Introduction to VHSIC Hardware Description Language (VHDL) including VHDL-based high-level design of microelectronic systems, VHDL programming, and VHDL synthesis; emphasis on learning and using industry-standard VHDL tools running on VNIX workstations. Credit will not be given for ECGR 5146 where credit has been given for ECGR 4146. *(Fall)*

ECGR 5161. Control of Robotic Manipulators. (3) Prerequisites: ECGR 4161 and 4111. Control of industrial robots including linear, nonlinear, and adaptive control of robot's motion plus control of forces and torques exerted by the end-effector. Additional topics include computer animation of the controlled behavior of industrial robots, actuator and sensor types, robot vision, and control computer/robot interfacing (dual-listed with MEGR 5128). Credit will not be given for ECGR 5161 where credit has been given for ECGR 4162. *(Spring)*

ECGR 5165. Laser Electronics I. (3) Prerequisites: ECGR 3121 and PHYS 3141, with a grade of C or better or permission of the Department. Basic principles of quantum electronics, interaction of light with atoms, properties of laser light, laser applications. Electromagnetic aspects of lasers, Maxwell's Equations and beam, ray optics, matrix methods for the analysis and synthesis of optical systems. Laser resonator design, oscillations modes, mode frequency and stability. Credit will not be given for ECGR 5165 where credit has been given for ECGR 4165. *(Fall)*

ECGR 5181. Computer Arithmetic. (3) Prerequisite: permission of department. Principles, architecture and design of fast two operand adders, multi-operand adders, standard multipliers and dividers. Cellular array multipliers and dividers. Floating point processes, BCD and excess three adders, multipliers and dividers. Credit will not be given for ECGR 5181 where credit has been given for ECGR 4181. *(On demand)*

ECGR 5182. Digital System Testing. (3) Prerequisite: ECGR 2181 with a grade of C or better or permission of department. System testing; Boolean difference; D-algorithm; checking experiments; redundancy, computer-aided digital test systems. Credit will not be given for ECGR 5182 where credit has been given for ECGR 4182. *(Spring)*

ECGR 5187. Data Communications. (3) Prerequisite: permission of department. Principles of data communication; computer communications architecture (layering) with emphasis on the physical layer and data link layer, transmission media; analog and digital signal representation; data transmission basics; Shannon's theorem; error detection/correction; data compression; point-to-point protocols; multiplexing. Credit will not be given for ECGR 5187 where credit has been given for ECGR 4187. *(Fall)*

ECGR 5188. Modeling and Analysis of Dynamic Systems. (3) Prerequisite: ECGR 3111 or permission of the department. Models and dynamical properties of mechanical, thermal, and fluid systems, utilizing by analogy the properties of electrical circuit theory. Emphasis on the formulation of circuit models and the development of terminal equations of system components. Dynamic response to step, pulse, and sinusoidal driving functions using Laplace transforms. Sinusoidal steady-state and frequency response of systems. Credit will not be given for ECGR 5188 where credit has been given for ECGR 4113. *(On demand)*

ECGR 5190. Acoustics. (3) Prerequisite: ECGR 3122 or PHYS 4231. Vibrations and simple vibrating systems; radiating systems; plane waves of sound; dynamic analogies, microphones and other acoustic transducers; acoustic measurements. Credit will not be given for ECGR 5190 where credit has been given for ECGR 4122. *(On demand)*

ECGR 5191. Analog and Digital Communication. (3) Prerequisite: ECGR 3111. Analysis and transmission of signals including analog communication systems (amplitude and frequency modulation, effect of noise); digital communications systems (pulse code modulation, data transmission systems phase-shift keying and frequency-shift keying, effect of noise). Credit will not be given for ECGR 5191 where credit has been given for ECGR 4123. *(Fall) (Evenings)*

ECGR 5192. Solid State Microelectronics II. (3) Prerequisites: ECGR 3122 and 3133 each with a grade of C or better. Advanced device concepts for MOSFET, bipolar, and CMOS integrated circuits. Gate length, transit time, and power-frequency limits. Device scaling concepts. Tunneling and avalanche devices, and hot electron behavior. Device and interconnect reliability and failure and device interconnects. Submicron channel, MODFET, and quantum well devices. High frequency solid state devices. Limits of switching speed. Solid state power devices. Credit will not be given for ECGR 5192 where credit has been given for ECGR 4134. *(Spring)*

ECGR 5193. Power System Analysis I. (3) Prerequisite: ECGR 3142 with a grade of C or better. Representation of power system components for analysis studies. Transmission line parameters. Network equations. Load flow analysis and numerical methods. Credit will not be given for ECGR 5193 where credit has been given for ECGR 4141. *(Fall)*

ECGR 5194. Power System Analysis II. (3) Prerequisite: ECGR 4141 with a grade of C or better. Economic operation of power systems. Short circuit studies. Symmetrical components. Transient stability analysis. Credit will not be given for ECGR 5194 where credit has been given for ECGR 4142. *(Spring)*

ECGR 5195. Electrical Machinery. (3) Prerequisite: ECGR 3142 with a grade of C or better. Advanced theory of transformers and rotating. Machines; harmonic and saturation effects on machine performance. Unbalanced operation and transient conditions. Credit will not be given for ECGR 5195 where credit has been given for ECGR 4143. *(On demand)*

ECGR 5196. Introduction To Robotics. (3) Prerequisites: ECGR 2103 or MEGR 2101 and senior standing. Modeling of industrial robots including homogeneous transformations, kinematics, velocities, static forces, dynamics, computer animation of dynamic models, motion trajectory planning, and introduction to vision, sensors and actuators (dual-listed with MEGR 4127). Credit will not be given for ECGR 5196 where credit has been given for either ECGR 4161 or MEGR 4127. *(Fall)*

ECGR 5197. Optical Communication. (3) Prerequisites: ECGR 4125 or permission of Department. Overview of optical fiber, signal degradation in fiber, optical source, optical detectors, optical receiver, optical transmitter, optical network, signal processing, and signal distribution through DWDM and DWDDM. This course also addresses the recent topics in optical communication and optical signal. Credit will not be given for ECGR 5197 where credit has been given for ECGR 4186. *(Fall)*

ECGR 5231. Optical Materials. (3) Prerequisites: ECGR 4125 or permission of Department. Overview of optical properties of semiconductors and dielectrics, optical waves in crystalline and periodic structures, optical nonlinearities and their applications in optical frequency conversions, and current topics in optical properties. *(Spring)*

ECGR 5261. Microwave Circuit Design I. (3) Prerequisites: ECGR 3131 and graduate standing, or permission of department. Design and analysis of microwave devices and circuits; including microwave aspects of discrete active (i.e., field effect and bipolar transistors, etc.) and passive (i.e., microstrips, inductors, capacitors) components; device parameter extraction, using computer aided design (CAD) tools. Credit will not be given for ECGR 5261 where credit has been given for ECGR 4261. *(Fall)*

ECGR 5265. Microwave Devices and Electronics. (3) Prerequisites: ECGR 3122 and PHYS 2231 with grades of C or better or permission of department. Microwave transmission line theory, parameters, microwave waveguides, microstrip line and components including resonators, slow-wave structures, tees, rings, couplers, circulators, isolators, and microwave tubes. Microwave solid state electronics including microwave transistors, tunnel diodes, transferred electron devices, avalanche transit-time devices, and mono-lattice microwave integrated circuits. Credit will not be given for ECGR 5265 where credit has been given for ECGR 4265. *(On demand)*

ECGR 5411. Control Systems Theory I. (3) Prerequisite: ECGR 3111 with a grade of C or better. Transfer functions, block diagrams and signal flow graphs. Feedback control system characteristics. The performance and stability of feedback systems using root locus and frequency response methods. Time domain analysis of control systems. The design and compensation of control systems. Credit will not be given for ECGR 5411 where credit has been given for ECGR 4111. *(Fall)*

ECGR 5412. Control Systems Theory II. (3) Prerequisite: ECGR 4111 with a grade of C or better. State space techniques and useful state space methods. System stability. Controllability and observability of linear systems. The formulation of the state equations for discrete-time systems and the analysis of these systems by matrices. Analysis of nonlinear systems. Optimal control systems studies. Credit will not be given for ECGR 5412 where credit has been given for ECGR 4112. *(Spring)*

ECGR 5431. Linear Integrated Electronics. (3) Prerequisite: ECGR 3132 with a grade of C or better. Design of linear integrated circuits utilizing bipolar and MOS devices. Application in linear amplifier design, control and processing of analog signals. Power supply regulators, analog switches, and active filters. Credit will not be given for ECGR 5431 where credit has been given for ECGR 4131. *(Fall)*

ECGR 6021. Advanced Topics in EM and Applications. (3) Prerequisite: permission of Department. Possible topics include: advanced boundary value problems; nonlinear magnetic materials; wave guides and resonant cavities; magnetohydrodynamics and plasmas; relativistic effects; charged particle dynamics; radiation. Credit will not be given for ECGR 6021 where credit has been given for ECGR 8021. *(On demand)*

ECGR 6101. Advanced Computer Graphics. (3) Prerequisites: ECGR 5103 and 5133 or permission of department. A project-oriented course using and developing techniques of CAD/CAM graphics, hardware and software development. Advanced application of graphics in computer-aided systems design. Credit will not be given for ECGR 6101 where credit has been given for ECGR 8101. *(On demand)*

ECGR 6102. Optimization of Engineering Designs. (3) Prerequisite: ECGR 5101 or consent of department. The development of computationally feasible algorithms for solving optimization problems in engineering designs. Introduction to non-linear programming methods; study of constrained and unconstrained problems, linear programming problems and other related topics. Credit will not be given for ECGR 6102 where credit has been given for ECGR 8102. *(On demand)*

ECGR 6111. Systems Theory. (3) Prerequisite: ECGR 4112 or consent of Department. State space concepts and solutions. Introduction to theory of deterministic linear systems. Application of matrix methods and vector difference equations to lumped parameter electrical mechanical and fluid systems, and discrete time systems. Frequency domain techniques in signal and systems analysis. Computer simulation of system dynamics. Credit will not be given for ECGR 6111 where credit has been given for ECGR 8111. *(Fall) (Evenings)*

ECGR 6112. Digital Control Systems. (3) Prerequisites: ECGR 6111 and 4181 or consent of Department. Time-domain and Z-domain analysis of linear discrete systems, open and closed loop sampled data systems, engineering characteristics of computer control systems, simulation of system dynamics. Credit will not be given for ECGR 6112 where credit has been given for ECGR 8112. *(Spring, Alternate years)*

ECGR 6114. Digital Signal Processing II. (3) Prerequisite: permission of Department. Discrete Hilbert Transforms, discrete random signals, effect of finite register length in digital and signal processing, speech processing, radar and other applications. Credit will not be given for ECGR 6114 where credit has been given for ECGR 8114. *(Spring, Alternate years) (Evenings)*

ECGR 6115. Optimal Control Theory I. (3) Prerequisite: ECGR 6111 or permission of Department. Optimum control of continuous-time and discrete time systems. The Maximum Principle and Hamilton Jacobi Theory. Theory of optimal regulator, state estimation and Kalman Bucy Filter. Combined estimation and control--the Linear Quadratic Gaussian Problems. Computational methods in optimum control systems. Credit will not be given for ECGR 6115 where credit has been given for ECGR 8115. *(Fall, Alternate years) (Evenings)*

ECGR 6116. Optimal Control Theory II. (3) Prerequisite: ECGR 6115 or permission of Department. A continuation of ECGR 6115 with emphasis on stochastic systems. Optimal filtering. Discrete-time Kalman filter and Kalman filter properties. Parameter identification. Multi-variable control systems, system sensitivity and robustness. Credit will not be given for ECGR 6116 where credit has been given for ECGR 8116. *(Spring, Alternate years) (Evenings)*

ECGR 6117. Multivariable Controls. (3) Prerequisites: ECGR 6111. Problem of robustness controls, emphasizing computer-oriented approaches; high infinity and algebraic methods current developments. Credit will not be given for ECGR 6117 where credit has been given for ECGR 8117. *(On demand)*

ECGR 6118. Applied Digital Image Processing. (3) Cross-listed with CSCI 6134. Digital image fundamentals; comparison of image transforms including Fourier, Walsh, Hadamard and Cosine; image data compression techniques; image enhancement algorithms; image restoration; image encoding process; image segmentation and description; relationship of hardware restrictions to image fidelity. Credit will not be given for ECGR 6118 where credit has been given for ECGR 8118. *(On demand)*

ECGR 6121. Advanced Theory of Communications I. (3) Prerequisite: introductory probability course or permission of department. Statistical communications theory and modern communications systems emphasizing modulation and methods of taking into account the effects of noise on various systems. Credit will not be given for ECGR 6121 where credit has been given for ECGR 8121. *(Fall, Alternate years) (Evenings)*

ECGR 6122. Advanced Theory of Communications II. (3) Prerequisite: ECGR 6121 or permission of Department. Continuation of ECGR 6121 including coding and decoding methods. Wave form communications. Applications. Credit will not be given for ECGR 6122 where credit has been given for ECGR 8122. (Spring, Alternate years) *(Evenings)*

ECGR 6125. Advanced Topics in Optical Engineering. (3) Prerequisite: ECGR 5125. Overview of optical passive and active devices and discussion of current advances in optical technologies. Credit will not be given for ECGR 6125 where credit has been given for ECGR 8125. *(On demand)*

ECGR 6127. Medical Ultrasonics. (3) Prerequisite: ECGR 3122 or PHYS 4231 with grade of C or better, or

permission of Department. Acoustic wave propagation in fluids and solids, acoustic impedances, acoustic radiators and beam profiles; piezoelectricity, piezoelectric ceramics and polymers, integrated ultrasound transducers, design and testing of medical ultrasound transducers; hyperthermia, imaging, tissue characterization. Credit will not be given for ECGR 6127 where credit has been given for ECGR 8127. *(Spring)*

ECGR 6131. Hybrid Microelectronics. (3) Prerequisite: ECGR 5132 or permission of Department. A project-oriented course involving design, bonding, interconnect and testing of a multidie hybrid microelectronics circuit. Emphasis placed upon use of I.C.'s of various technologies in these designs to optimize performance. Credit will not be given for ECGR 6131 where credit has been given for ECGR 8131. *(On demand)*

ECGR 6132. Advanced Semiconductor Device Physics. (3) Prerequisite: ECGR 5137 or permission of Department. A review of semiconductor physics, bipolar and unipolar devices, photonic devices and methods of measuring specific device characteristics. Credit will not be given for ECGR 6132 where credit has been given for ECGR 8132. *(Spring)*

ECGR 6133. MOS Physics and Technology. (3) Prerequisite: ECGR 6132 or permission of the instructor. The theoretical and practical aspects of the metal oxide semiconductor (MOS) system, its electrical properties, and the measurement and the technology for their control. These topics are developed from simple beginnings to the current state of the art. Credit will not be given for ECGR 6133 where credit has been given for ECGR 8133. *(Fall)*

ECGR 6138. Physical Design of VSLI Systems. (3) Prerequisite: ECGR 5133 or equivalent. Synthesis and design of high-speed VLSI circuits; state-of-the-art approaches for circuit simulation; models and techniques for VLSI physical design. Credit will not be given for ECGR 6138 where credit has been given for ECGR 8138. *(Spring)*

ECGR 6141. Power System Relaying. (3) Prerequisite: ECGR 5141 or permission of Department. Function and principles of protective relaying instrument transformers. Directional, distance and differential relays. Protection of generators, transformers, and transmission lines. Ground fault protection. Computer relaying, algorithms for protective relaying. Credit will not be given for ECGR 6141 where credit has been given for ECGR 8141. *(On demand)*

ECGR 6142. Voltage Transients and Surge Protection. (3) Prerequisite: ECGR 5141 or permission of Department. Overvoltages due to lightning and switching surges. Traveling waves on transmission lines. Surge arrestors, insulation coordination. Surge protection of transmission lines, substations and rotating machine. Shielding and grounding. Credit will not be given for ECGR 6142 where credit has been given for ECGR 8142. *(On demand)*

ECGR 6143. Power System Control. (3) Prerequisites: ECGR 4142 and 4111 or permission of Department. Computer functions for automatic control of power systems. Automatic generation control, regulation of frequency and tie-line power interchanges. Automatic voltage regulation, excitation system model. Power system dynamics. Computer control centers. Credit will not be given for ECGR 6143 where credit has been given for ECGR 8143. *(On demand)*

ECGR 6146. Advanced VHDL. (3) Prerequisite: ECGR 5146 or permission of Department. Continuation of ECGR 5146. FPGA design with VHDL; VHDL modeling libraries and techniques, and VHDL coding methodology for efficient synthesized. Credit will not be given for ECGR 6146 where credit has been given for ECGR 8146. *(Spring)*

ECGR 6151. Advanced Microelectronics Projects. (3) Prerequisite: ECGR 5133. Project-oriented course for the advanced microelectronics student to pursue the testing and simulation at various levels (component, gate, cell and system), as well as the design of a significant VLSI implementation. Credit will not be given for ECGR 6151 where credit has been given for ECGR 8151. *(On demand)*

ECGR 6156. Application Specific Integrated Circuit Design. (3) Prerequisite: ECGR 5133 or permission of Department. Basic concepts, techniques and CAD tools in Application Specific IC Designs (ASIC); technology of ASIC circuits, method of design, CAD tools, and simulation and verification; practical aspects of design. Credit will not be given for ECGR 6156 where credit has been given for ECGR 8156. *(Fall)*

ECGR 6171. Simulation of Electronic Materials. (3) Prerequisites: PHYS 6142 and PHYS 4271/ECGR 4185 or permission of Department. Tight-binding theory of periodic solids; bond orbital theory applied the linear and non-linear optical properties of insulators and semiconductors; calculation of vibrational spectra; Green's Function methods for amorphous solids. Simulation of electrically active defeats in solids. Credit will not be given for ECGR 6171 where credit has been given for ECGR 8171. *(On demand)*

ECGR 6183. Multiprocessor Systems Design. (3) Prerequisites: ECGR 3184 and 5131. Topics include applications of multiprocessors to digital systems design; hardware/software tradeoff considerations; master/slave, multiple/master and loosely coupled systems; data handling and synchronization problems, networking. Credit will not be given for ECGR 6183 where credit has been given for ECGR 8183. *(On demand)*

ECGR 6184. Computer System Engineering. (3) Prerequisite: consent of Department. Topics include data formats, register transfer operations, computer organization, microprogram control and ALU design. Arithmetic algorithms, I/O organization and memory organization are also covered. Specific emphasis is placed throughout on tradeoffs between hardware and software. Credit will not be given for ECGR 6184 where credit has been given for ECGR 8184. *(On demand)*

ECGR 6185. Advanced Microprocessor-Based Design. (3) Prerequisite: CSCI 4181 or permission of Department. An advanced course in computer design utilizing 16-bit micro processors. Architecture, software, and interface techniques. This course is project-oriented, involving the use of a logic analyzer. Credit will not be given for ECGR 6185 where credit has been given for ECGR 8185. *(Fall) (Evenings)*

ECGR 6186. Design for Testability. (3) Prerequisite: ECGR 2181 or permission of Department. Fault modeling; test generation using the D-algorithm, PODEM, and FAN; partitioning; scan design, built-in self-testing; testing of array logic; and fault tolerance. Project-oriented course involving the use of logic and fault simulation tools. Credit will not be given for ECGR 6186 where credit has been given for ECGR 8186. *(Spring) (Evenings)*

ECGR 6187. Modeling and Analysis of Communication Networks. (3) Prerequisite: Probability theory or consent of the department. Communication networks; application of analytical tools for modeling and performance evaluation of these networks, including stochastic processes, Markov models, queuing theory, and teletraffic theory. Credit will not be given for ECGR 6187 where credit has been given for ECGR 8187. *(Spring)*

ECGR 6261. Advanced Topics in Laser Electronics. (3) Prerequisite: ECGR 5165, or permission of instructor. Maxwell-Schrödinger analysis of interactions of light with atoms, Semiclassical laser equations, rate equation approximation. Effects of gain saturation, dispersion, spontaneous emission, and line broadening in laser amplifiers and oscillators. Laser power and frequence calcaulation. Relaxation oscillations, gain and loss switching, cavity-dumping, and mode-locking. Credit will not be given for ECGR 6261 where credit has been given for ECGR 8261. *(Spring)*

ECGR 7999. Master's Degree Graduate Residency Credit. (1)

ECGR 8021. Advanced Topics in EM and Applications. (3) See ECGR 6021 for Course Description. Credit will not be given for ECGR 8021 where credit has been given for ECGR 6021.

ECGR 8101. Advanced Computer Graphics. (3) See ECGR 6101 for Course Description. Credit will not be given for ECGR 8101 where credit has been given for ECGR 6101.

ECGR 8102. Optimization of Engineering Designs. (3) See ECGR 6102 for Course Description. Credit will not be given for ECGR 8102 where credit has been given for ECGR 6102.

ECGR 8111. Systems Theory. (3) See ECGR 6111 for Course Description. Credit will not be given for ECGR 8111 where credit has been given for ECGR 6111.

ECGR 8112. Digital Control Systems. (3) See ECGR 6112 for Course Description. Credit will not be given for ECGR 8112 where credit has been given for ECGR 6112.

ECGR 8114. Digital Signal Processing II. (3) See ECGR 6114 for Course Description. Credit will not be given for ECGR 8114 where credit has been given for ECGR 6114.

ECGR 8115. Optimal Control Theory I. (3) See ECGR 6115 for Course Description. Credit will not be given for ECGR 8115 where credit has been given for ECGR 6115.

ECGR 8116. Optimal Control Theory II. (3) See ECGR 6116 for Course Description. Credit will not be given for ECGR 8116 where credit has been given for ECGR 6116.

ECGR 8117. Applied Artificial Intelligence. (3) See ECGR 6117 for Course Description. Credit will not be given for ECGR 8117 where credit has been given for ECGR 6117.

ECGR 8118. Applied Digital Image Processing. (3) See ECGR 6118 for Course Description. Credit will not be given for ECGR 8118 where credit has been given for ECGR 6118.

ECGR 8121. Advanced Theory of Communications I. (3) See ECGR 6121 for Course Description. Credit will not be given for ECGR 8121 where credit has been given for ECGR 6121.

ECGR 8122. Advanced Theory of Communications II. (3) See ECGR 6122 for Course Description. Credit will not be given for ECGR 8122 where credit has been given for ECGR 6122.

ECGR 8125. Advanced Topics in Optical Engineering. (3) See ECGR 6125 for Course Description. Credit will not be given for ECGR 8125 where credit has been given for ECGR 6125.

ECGR 8127. Medical Ultrasonics. (3) See ECGR 6127 for Course Description. Credit will not be given for ECGR 8127 where credit has been given for ECGR 6127.

ECGR 8131. Hybrid Microelectronics. (3) See ECGR 6131 for Course Description. Credit will not be given for ECGR 8131 where credit has been given for ECGR 6131.

ECGR 8132. Advanced Semiconductor Device Physics. (3) See ECGR 6132 for Course Description. Credit will not be given for ECGR 8132 where credit has been given for ECGR 6132.

ECGR 8133. MOS Physics and Technology. (3) See ECGR 6133 for Course Description. Credit will not be given for ECGR 8133 where credit has been given for ECGR 6133.

ECGR 8138. Physical Design of VSLI Systems. (3) See ECGR 6138 for Course Description. Credit will not be given for ECGR 8138 where credit has been given for ECGR 6138.

ECGR 8141. Power System Relaying. (3) See ECGR 6141 for Course Description. Credit will not be given for ECGR 8141 where credit has been given for ECGR 6141.

ECGR 8142. Voltage Transients and Surge Protection. (3) See ECGR 6142 for Course Description. Credit will not be given for ECGR 8142 where credit has been given for ECGR 6142.

ECGR 8143. Power System Control. (3) See ECGR 6143 for Course Description. Credit will not be given for ECGR 8143 where credit has been given for ECGR 6143.

ECGR 8146. Advanced VHDL. (3) See ECGR 6146 for Course Description. Credit will not be given for ECGR 8146 where credit has been given for ECGR 6146.

ECGR 8151. Advanced Microelectronics Projects. (3) See ECGR 6151 for Course Description. Credit will not be given for ECGR 8151 where credit has been given for ECGR 6151.

ECGR 8156. Application Specific Integrated Circuit Design. (3) See ECGR 6156 for Course Description. Credit will not be given for ECGR 8156 where credit has been given for ECGR 6156.

ECGR 8171. Simulation of Electronic Materials. (3) See ECGR 6171 for Course Description. Credit will not be given for ECGR 8171 where credit has been given for ECGR 6171.

ECGR 8183. Multiprocessor Systems Design. (3) See ECGR 6183 for Course Description. Credit will not be given for ECGR 8183 where credit has been given for ECGR 6183.

ECGR 8184. Computer System Engineering. (3) See ECGR 6184 for Course Description. Credit will not be given for ECGR 8184 where credit has been given for ECGR 6184.

ECGR 8185. Advanced Microprocessor-Based Design. (3) See ECGR 6185 for Course Description. Credit will not be given for ECGR 8185 where credit has been given for ECGR 6185.

ECGR 8186. Design for Testability. (3) See ECGR 6186 for Course Description. Credit will not be given for ECGR 8186 where credit has been given for ECGR 6186.

ECGR 8187. Modeling and Analysis of Communication Networks. (3) See ECGR 6187 for Course Description. Credit will not be given for ECGR 8187 where credit has been given for ECGR 6187.

ECGR 8261. Advanced Topics in Laser Electronics. (3) See ECGR 6261 for Course Description. Credit will not be given for ECGR 8261 where credit has been given for ECGR 6261.

ECGR 9999. Doctoral Degree Graduate Residency Credit. (1)

ENGINEERING MANAGEMENT

Engineering Management Program

332 Kennedy
704-687-3989
http://www.coe.uncc.edu/mem/

Degree

M.S.

Coordinator

Dr. S. Gary Teng

Graduate Faculty

Ertunga Ozelkan, Ph.D., Assistant Professor
Douglas Ramers, Ph.D., Assistant Professor
Yesim Sireli, Ph.D., Assistant Professor
S. Gary Teng, Ph.D., P.E., Associate Professor and Director
Steven Gardner, J.D., Adjunct Professor

MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

The Engineering Management Master of Science Degree program prepares professionals for careers in managing projects, programs, systems, and organizations. Industrial, research, consulting, and commercial firms now demand

engineering managers with both cutting-edge technical competence and the management skills necessary to forge linkages with the systems and business sides of these organizations. These managers must be able to form and manage high performance teams and manage business and technological operations. The program of study is necessarily multidisciplinary, combining elements of advanced study in various engineering disciplines with studies of business and system operations and organizational behavior.

Additional Admission Requirements

1) Either a bachelor's degree in engineering or a closely related technical or scientific field, or a bachelors degree in business, provided relevant technical course requirements have been met. It is expected that some students in the second category will have a major in business and a minor in engineering.
2) Undergraduate coursework in engineering economics (or equivalent).
3) Integral and differential calculus (MATH 1120 and 1121 at UNC Charlotte).
4) Statistics (STAT 1220 or STAT 3128 at UNC Charlotte).
5) An average grade of 3.0 (out of 4) on items 2, 3, and 4 above.

Documents to be submitted for admission

1) Transcript(s) showing a baccalaureate degree in engineering, engineering technology, or a scientific discipline, or a baccalaureate degree in business administration from an accredited college or university.
2) A satisfactory score on the General Test of the Graduate Record Examination (depending on the student's background, the Graduate Management Admission Test, GMAT, may be substituted in certain cases).
3) Written descriptions of any relevant and significant work experience.
4) If the applicant's native language is not English, an overall score of 575 (old system) or 230 (new computer-based examination) in the Test of English as a Foreign Language (TOEFL).

Early Entry Program

Undergraduate students with at least 75 semester hours completed toward a baccalaureate degree in Civil, Electrical, or Mechanical engineering, or Engineering Technology at UNC Charlotte may be admitted to the MS Engineering Management Program as an Early Entry student provided they meet all other requirement of admission except the first item of the admission requirements.

Degree Requirements

Thirty semester hours of approved graduate work within one of two options:

Option 1: Successful completion of 30 semester hours of graduate-level coursework.
Option 2: Successful completion of 24 semester hours of graduate-level coursework and 6 hours of thesis research.

The curriculum consists of six core courses and four additional courses (or two courses with the thesis option) selected from an approved list of electives. Students are expected to complete a Plan of Study that identifies a concentration such as Manufacturing Management, Technology Management, Systems Management, or Supply Chain Management.

Required Core Courses:

1) EMGT6980 Industrial and Technology Management Seminars. (1) (EMGT students must have three credits in this course.)

2) Three courses from among the following:
   - EMGT6142 Quality and Manufacturing Management (3)
   - EMGT6901 Advanced Project Management (3)
   - EMGT6902 Legal Issues in Engineering Management (3)
   - EMGT6904 Product and Process Design (3)
   - EMGT6906 Processing Systems Simulation (3)
   - EMGT6950 Engineering Systems Integration (3)
   - EMGT6955 Systems Reliability Engineering (3)
   - EMGT6985 Engineering Management Project (3)

3) Two courses from among the following:
   - MBAD6141 Operations Management (3)
   - MBAD6161 Organizational Leadership and Behavior I (3)
   - MBAD6164 Executive Communications (3)
   - MBAD6195 Strategic Management of Technology (3)

Note: Students will be required to have adequate preparation prior to taking the required MBAD (Master in Business Administration) courses. Normally this will consist of at least completion of courses in engineering economics, foundations of economics, and mathematics through differential and integral calculus. Students will be advantaged by having completed courses in foundations of accounting and statistics.

Interdisciplinary Elective Courses (four courses or two courses with thesis option) from the following Engineering Management Program course list or approved by your advisor from other graduate programs.

- EMGT6142 Quality and Manufacturing Management (3)
- EMGT6901 Advanced Project Management (3)
- EMGT6902 Legal Issues in Engineering Management (3)
- EMGT6904 Product and Process Design (3)
- EMGT6905 Designed Experimentation (3)
- EMGT6906 Processing Systems Simulation (3)

EMGT6910 Technological Decision-Making (3)
EMGT6912 Techniques and Intelligent Tools for Engineering Decision Support (3)
EMGT6915 Engineering Decision Analysis (3)
EMGT6920 Logistics Engineering and Management (3)
EMGT6930 Capital Cost Estimating (3)
EMGT6950 Engineering Systems Integration (3)
EMGT6955 Systems Reliability Engineering (3)
EMGT6985 Engineering Management Project (3)
EMGT6090 Lean Supply Networks (3)
EMGT6090 Engineering Systems Optimization (3)

Graduate courses from other programs may be taken as elective courses for the engineering management degree with approval of the program director. Students are responsible for fulfilling the prerequisites of the courses they plan to take from other graduate programs.

Courses in Engineering Management

EMGT 6090. Special Topics. (1-6) Directed study of current topics of special interest. May be repeated for credit. *(On demand).*

EMGT 6142. Quality and Manufacturing Management. (3) Provides an in-depth study of current issues and advances in manufacturing management. Topics include just-in-time inventory management, total quality management, statistical process control, continuous improvement, flexible manufacturing systems, computer-integrated manufacturing, technology evaluation and selection, and manufacturing strategy. Emphasis on use of computers for decision support. *(On demand)*

EMGT 6890. Individual Study. (1-6) Individual investigation and exposition of results. May be repeated for credit. *(On demand)*

EMGT 6901. Advanced Project Management. (3) Prerequisite: Consent of Instructor. Study of various aspects of project management including project types and organizations, regulatory and liability issues, planning, budget, risk assessment, and conflict resolution. Exercises involve research into emerging management processes, use of computerized techniques, and application of management theories in team-based projects. *(On demand).*

EMGT 6902. Legal Issues in Engineering Management. (3) Survey of legal issues surrounding engineering products and services, including warranty, liability, contracting, intellectual property, codes, and accepted practice. Legal principles, precedents, case studies, and research projects. *(On demand)*

EMGT 6904. Product and Process Design. (3) Application of principles of creative problem solving to design of products and processes by multi-disciplinary teams. Taking as the definition of design "the communication of a set of rational decisions for accomplishing stated objectives within prescribed constraints," the teams produce elements of designs for various products and services at points in the sequential stages of design. Teams make periodic reports and presentations to the class on design assignments. *(On demand)*

EMGT 6905. Designed Experimentation. (3) Prerequisites: Statistics and consent of instructor. Design of quality into products and processes using statistically designed experimentation (DOE), a systematic and efficient method of design optimization for enhanced performance, quality, and cost. Emphasis on designing and conducting useful experiments rather than the basis in statistical theory. Includes robust parameter design and tolerance design techniques. Review and comparison of Taguchi methods with conventionally designed experimentation. Extensive use of specialized computer software to design experiments and analyze results in team projects; screening experiments, and sequential response surface methods. *(On demand)*

EMGT 6906. Processing Systems Simulation. (3) Prerequisite: Statistics. Principles and application of selecting, planning, and executing simulation projects for processing systems, and developing and experimenting with simulation models. Discrete event simulation is particularly powerful for modeling and experimenting with systems exhibiting interdependencies and variability - such as manufacturing and service systems. Students will learn simulation project management, modeling, and experimenting using commercial simulation software products. *(On demand)*

EMGT 6910. Technological Decision-Making. (3) Prerequisite: Consent of Instructor. This course covers several techniques for engineering product design, development and improvement. A variety of decision making techniques such as several forecasting methods and quality function deployment are discussed specifically in the context of systems engineering applications, based on engineering design philosophy of cross- functional cooperation in order to create high quality products. Students will learn how to use these techniques for making effective engineering decisions in a technological environment. (*on demand*)

EMGT 6912. Techniques and Intelligent Tools for Engineering Decision Support. (3) Prerequisite: Consent of Instructor. This course surveys and introduces techniques and automated tools to support complex engineering decision-making, as well as methods for evaluating and selecting appropriate tools. During the course we will review and introduce decision-making processes and techniques; traditional automated decision support tools such as CAD, FEA, CFD, and other conventional modeling and simulation tools; decision support tools based on soft-computing technologies such

as knowledge based expert systems, fuzzy logic, artificial neural nets, and genetic algorithms; and methods to evaluate and select tools appropriate for specific applications. Students will be introduced to an overview of the underlying technologies used in the tools, learn the characteristics of applications appropriate for the tools, learn how to evaluate and select the decision support tools appropriate for an application, and demonstrate their understanding by preparing examples in applications. (*on demand*)

EMGT 6915 Engineering Decision Analysis. (3) Prerequisites: Integral and Differential Calculus, Statistics, Probability or Consent of Instructor. This course aims to provide some useful tools for analyzing difficult decisions and making the right choice. After introducing components and challenges of decision making, the course will proceed with the discussion of structuring decisions using decision trees and influence diagrams. Decision making under uncertainty will be emphasized including maximax, maximin, and minimax regret techniques. Modeling of different risk attitudes based on risk and return tradeoffs will be analyzed through utility theory. Finally, decisions under conflicting objectives and multiple criteria will be discussed along with some introduction to game theory. (*on demand*)

EMGT 6920. Logistics Engineering and Management. (3) Prerequisite: Consent of Instructor. This course introduces logistics systems from a systems engineering perspective. It starts from the design of effective and efficient systems with their respective maintenance and support infrastructures to the coordination of the production and distribution of systems and products for customer use at different stages of a final product's life cycle. The emphasis is on the design and implementation of effective and efficient logistics systems and supply chains. The course contents also include the current management issues in logistics systems implementation and supply chain operations. (*on demand*)

EMGT 6930. Capital Cost Estimating. (3) Prerequisite: Consent of Instructor. Provides in-depth study of cost management issues in a technological business environment. It covers cost concepts including project evaluation techniques based on cost, capital planning and budgeting, investment evaluation under risk and uncertainty, rate of return methods, estimating for economic analyses, inflation effects, depreciation and income taxes, and capital investment decision analysis. Private and public sector cost issues are also discussed. The tools and techniques presented are useful for engineering, business, or management professionals of any organization. Students will learn how to use the course material for effective project management, budgeting, and decision making. (*on demand*)

EMGT 6950. Engineering Systems Integration. (3) Prerequisite: Consent of Instructor. This course is an introduction to the relevant issues and required techniques for successful systems design development, integration, management, and implementation. Principles and methods for system life-cycle analysis, system planning and management, and systems integration. Interfaces between the system, subsystems, the environment, and people. Students will learn the factors to control the total system development process designed to ensure a high quality and effective system. *(On demand)*

EMGT 6955. Systems Reliability Engineering. (3) Prerequisites: Calculus and Statistics. Introduction of concepts and methods for the design, testing and estimation of component and system reliabilities. Topics include: reliability mathematics; analysis of reliability data; reliability prediction and modeling; reliability testing: maintainability and availability; failure mode and effects analysis and failure rates; reliability design and implementation; application of concurrent engineering and reliability methods to integrate reliability tests into the overall system development cycle to reduce overall life cycle costs. *(On demand)*

EMGT 6980. Industrial and Technology Management Seminars. (1) Prerequisite: Consent of Instructor. A series of seminars covering current management issues, challenges and practices in industrial, government, and business sectors of industry. May be repeated for credit. (All students in the Engineering Management MS Program are required to take this course for three semesters.) *(Fall, Spring)*

EMGT 6985. Engineering Management Project. (3) Prerequisite: EMGT 6901 and two other program required EMGT courses. This course will offer a hands-on real world industrial/business project. The emphasis will be on the design and implementation of effective methods on the development and/or improvement of products, processes, procedures, or systems. A 3-member project committee includes a faculty project advisor, the industrial project advisor, and a faculty member in the technical area has to be established before taking this project course. This project will be a capstone project for the students in the Engineering Management Master of Science Program. *(On demand)*

EMGT 6990. Industrial Internship. (1-3) Prerequisite: Completion of nine hours of graduate coursework. Full- or part-time academic year internship in engineering complementary to the major course of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by their graduate program director. Requires a mid-term report and final report to be submitted. (This course cannot be counted as part of the degree required 30 credits). (*on demand*)

EMGT 6991. Graduate Master Thesis Research. (1-6) Individual investigation culminating in the preparation

and presentation of a thesis. May be repeated for credit. *(On demand)*

EMGT 7999. Graduate Residence. (1) Required for continuing registration and enrollment while completing thesis or research project. *(On demand).*

MECHANICAL ENGINEERING AND ENGINEERING SCIENCE

Department of Mechanical Engineering and Engineering Science

245 Smith Building
704-687-2303
http://www.mees.uncc.edu/gprogram/grad.html

Degree

M.S.M.E., M.S.E., Ph.D.

Director of Graduate Programs

Dr. Harish P. Cherukuri

Graduate Faculty

Harish P. Cherukuri, Associate Professor
Robin N. Coger, Associate Professor
James F. Cuttino, Associate Professor
Matthew A. Davies, Associate Professor
Paul H. DeHoff, Professor Emeritus
Gloria D. Elliott, Assistant Professor
Horacio V. Estrada, Associate Professor
Yogeshwar Hari, Professor
Robert J. Hocken, Norvin Kennedy Dickerson Jr. Distinguished Professor
Robert E. Johnson, Professor
Russell G. Keanini, Associate Professor
Rhyn H. Kim, Professor Emeritus
Charles Y. Lee, Associate Professor
Gerald J. Micklow, Associate Professor
Ganesh P Mohanty, Bonnie E. Cone Distinguished Professor
Edward P. Morse, Assistant Professor
Brigid A. Mullany, Assistant Professor
Edgar G. Munday, Associate Professor
Ertunga C. Ozelkan, Assistant Professor
Steven R. Patterson, United Dominion Industries Distinguished Professor
Jayaraman Raja, Professor
Yesim Sireli, Assistant Professor
Ronald E. Smelser, Professor
K. Scott Smith, Professor
Stuart T. Smith, Professor
S. Gary Teng, Associate Professor
Robert G. Wilhelm, Professor
Terry T. Xu, Assistant Professor

Andrew Brown, Adjunct Associate Professor
William L. Griffin, Adjunct Professor
John B. Mason, Adjunct Professor
Mark C. Malburg, Adjunct Assistant Professor
Thomas H. McCoy, Adjunct Professor
Donna S. Nussman, Adjunct Professor
Richard D. Peindl, Adjunct Professor
John Patten, Adjunct Professor
James Salsbury, Adjunct Professor

The department of Mechanical Engineering and Engineering Science offers degree programs leading to the Master of Science in Mechanical Engineering (MSME), the Master of Science in Engineering (MSE), and the Doctor of Philosophy (Ph.D.). At the Master's level, the program is broad based, allowing students to develop expertise in a number of areas including design, manufacturing, thermal and fluid sciences, solid mechanics, bioengineering, materials engineering and science, and mechanical control and instrumentation. The Ph.D. program is more closely focused on precision engineering and manufacturing, computational modeling, and bioengineering. The graduate program is supported by a world class metrology laboratory, numerous graduate research and computer labs in the Cameron Applied Research Center, core and specialized biotechnology laboratories, and a first rate machine shop managed by a group of highly skilled lab and shop personnel. The William States Lee College of Engineering also supports a network of engineering computer laboratories.

MASTERS PROGRAMS IN MECHANICAL ENGINEERING AND ENGINEERING SCIENCE

The Department of Mechanical Engineering and Engineering Science offers programs of study and research leading to the Master of Science in Mechanical Engineering (M.S.M.E.) and the Master of Science in Engineering (M.S.E.). The M.S.M.E program of study is for students who have completed a B.S.M.E. degree while the M.S.E. degree offers a more generic program of study for students who may not possess a baccalaureate degree in engineering.

The objectives of the M.S.M.E and M.S.E. program are as follows.

- To provide our students with the opportunity to develop a breadth of knowledge in mechanical engineering so that they can adapt to the changing requirements of the technological workplace.
- To produce graduates who are able to practice as mechanical engineers with advanced skills and serve state, regional, and national industries.

- To prepare graduates for personal and professional success, both as individuals and in team environments.

Additional Admission Requirements

Applicants must demonstrate evidence of satisfactory undergraduate preparation in engineering, usually manifested by the possession of a baccalaureate degree from an accredited institution in some area of engineering, with a grade point average of at least 3.0 on a 4.0 scale. Special consideration may be given to candidates with substantial engineering work experience.

Applicants with baccalaureate degrees from fields other than engineering (e.g., biology, physics, chemistry, mathematics, etc.) may be considered for admission to graduate study. Typically these applicants complete mathematics, science, and engineering courses, as determined by the Director of Graduate Programs, before entering the graduate program.

The applicant must receive a satisfactory score on the verbal and quantitative sections of the Graduate Record Examination General Test.

Acceptability for admission is based upon the applicant's record and background as determined by the department.

Early-Entry to Graduate School

Exceptional undergraduate students at UNC Charlotte may be accepted into the graduate program and begin work toward a graduate degree before completion of the baccalaureate degree. An applicant may be accepted at any time after completion of 75 or more hours, although it is expected that close to 90 hours will have been earned by the time the first graduate course is taken.

To be accepted into this program, an undergraduate student must have at least a 3.2 overall GPA and have taken the appropriate graduate standardized test and have earned an acceptable score. If any early-entry student has not met the normal admission requirements of a 2.75 overall undergraduate GPA and a 3.0 junior-senior GPA at the end of his/her baccalaureate degree, she/he will be dismissed from the graduate program.

Students accepted into an early-entry program will be subject to the same policies that pertain to other matriculated graduate students. Generally, it will be assumed that early-entry students will finish their baccalaureate degrees before they complete 15 hours of graduate work.

Up to six hours earned at the graduate level may be substituted for required undergraduate hours. (Up to six hours of graduate work may be "double counted" toward both baccalaureate and graduate degrees.)

Degree Requirements

The applicant must complete at least 30 approved graduate credit hours as prescribed by the graduate advisor and fulfill the following:

- A minimum of 12 semester hours of coursework in Mechanical Engineering and Engineering Science.
- The completion of one mathematics course (3 hrs).
- Students pursuing the thesis or creative design project option may complete up to 6 hours of thesis research.
- Students pursuing the problem report option may complete up to 3 hours of problem report.
- Students pursuing the coursework-only option must satisfactorily complete a comprehensive exam that is administered by the advisory committee.

The required mathematics course can be any 6000 level math course approved by the thesis advisor or one of the following:

MATH6171	Advanced Applied Mathematics I
MATH6172	Advanced Applied Mathematics II
MATH6103	Computer Techniques and Numerical Methods

The decision as to whether a program will include a thesis, design project or problem report is to be made on an individual basis by the advisory committee at the time of filing the student's Plan of Study.

Academic Standards

Only the grades of A, B or C are accepted towards a graduate degree. A grade of U in any graduate course will suspend the student's enrollment subject to readmission as prescribed in the University catalog. Similarly, an accumulation of three C grades will result in suspension of the student's enrollment, subject to readmission to a program. A student in any graduate program is required to maintain satisfactory progress toward the degree. Continued enrollment is at all times subject to review on the basis of academic record and actions with regard to observance of University rules and regulations.

Admission to Candidacy Requirements

Upon completion of a substantial amount of graduate work and in no case later than two weeks prior to the beginning of the semester in which the student expects to complete all requirements for the degree, the student shall file for Admission to Candidacy on a form supplied by The Graduate School. This application is a checklist approved by the advisor, department chair, and the College Dean listing all coursework to be offered for the degree (including transfer credit and courses in progress). A tentative date for the comprehensive examination should be agreed upon and indicated on this application. The date should be realistic and allow ample time for completion and review of the thesis or project.

The student and faculty advisor will agree on the appointment of an advisory committee. The advisory committee will be composed of at least three graduate faculty members. The graduate advisor will serve as chair of the committee. The committee is recommended by the department after appropriate consultation between the advisor and student.

Transfer Credit
At the time of admission, up to six hours of transfer credit may be accepted from an ABET accredited engineering institution.

Assistantships
Teaching and research assistantships are available on a competitive basis.

Tuition Waivers
In-state and Out-of-state tuition waivers are available, on a competitive basis, to full time students with financial assistantships from UNC Charlotte.

PH.D. PROGRAM IN MECHANICAL ENGINEERING AND ENGINEERING SCIENCE

The Department of Mechanical Engineering and Engineering Science offers multi-disciplinary programs leading to a Ph.D. degree in mechanical engineering in the areas of biomedical engineering (BME), computational modeling and simulation (CMS), and precision engineering and manufacturing (PE).

The objectives of the Ph.D. program are as follows.

- To provide our students with the opportunity to develop a breadth of knowledge in mechanical engineering so that they can adapt to the changing requirements of the technological workplace.
- To develop engineering researchers who can contribute to the development of new knowledge and the dissemination of best practices in academic, industrial, and government environments.
- To prepare graduates for personal and professional success, both as individuals and in team environments.

Additional Admission Requirements
In addition to the general requirements for admission to the Graduate School, the following are required for study toward the Ph.D. program in Mechanical Engineering:

1) A master's degree in engineering or a closely allied field with a GPA of at least 3.5. Exceptional students with only a baccalaureate degree may also be considered for admission to the Ph.D. program.
2) The applicant must receive a satisfactory score on the verbal and quantitative sections of the Graduate Record Examination General Test.
3) Three letters of reference, at least two of which must be from faculty members. All three must be from professionals working in the applicant's field of interest.

Acceptability for admission is based upon the applicant's record and background as determined by the department.

Degree Requirements
1) Appointment of a Ph.D. advisor and formation of an advisory committee.
2) Development of a Ph.D. Plan of Study detailing all course and examination requirements.
3) Successful completion of the written qualifying examination.
4) Presentation of a proposal for Ph.D. research and admission to candidacy.
5) Successful defense of the Ph.D. Dissertation.

Within the first semester of being admitted into a Ph.D. program, the student should choose a Ph.D. advisor and form an advisory committee. In conjunction with the Ph.D. advisor and the advisory committee, the student will develop a Plan of Study to meet the Ph.D. program requirements of course work and examinations and prepare to undertake original research leading to a dissertation of a quality that would be acceptable for publication of articles in peer-refereed professional journals.

Plan of Study
The Plan of Study must show at least 72 hours of credit beyond the baccalaureate degree including at least 18 hours of research/dissertation credits. For students who do not possess appropriate bachelor's and/or master's degrees in engineering, additional course work will be expected. The specific course requirements will be set by the student's advisory committee but must include: At least 18 hours of MEES coursework, 6 hours of graduate level mathematics, and a minor consisting of 6 hours of coursework in a related (non-MEES) field of study. The Plan of Study must be submitted to the Graduate Coordinator of the Department for review and approval within the second semester after admission to the Ph.D. program.

Residence
A student may satisfy the residency requirement for the program by completing 18 hours, either course work or research credits, by study-in-residence during the academic year and during the summer terms, as long as the study is continuous. Study-in-residence is deemed to be continuous if the student is enrolled in one or more courses (including research/dissertation credit) in successive semesters until eighteen hours of credit are earned.

Grades
A student is expected to achieve A's or B's in all course work taken for graduate credit and must have a GPA of at last a 3.0 in order to graduate. The dissertation is graded on a Pass/Unsatisfactory basis and, therefore, will not be included in the cumulative average. An accumulation of more than two marginal C grades will result in termination of the student's enrollment in the graduate program. If a student makes a grade of U in any course, enrollment will be terminated. A graduate student whose enrollment has been terminated because of grades is ineligible to attend any semester or summer session unless properly readmitted to the graduate program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the student's major department and the Engineering Doctoral Graduate Committee of the College of Engineering.

Qualifying Examination
In addition to demonstrating a high level of competence in course work, the student must pass a comprehensive written qualifying examination in the major and minor areas. The qualifying examination should be taken before completion of 18 hours beyond the master's degree in the major and minor areas but must be passed no later than one year after initial admission to the program. Failure to pass the qualifying examination in two tries will result in the termination of the student's enrollment in the Ph.D. program.

Admission to Candidacy Requirements
The single requirement for admission to candidacy is the appointment of an advisory committee. This committee will consist of at least three graduate faculty members, one of whom shall be from a department other than the student's major, with the graduate advisor serving as chair of the committee. The committee is recommended by the department after appropriate consultation between the advisor and student.

Dissertation Proposal and Admission to Candidacy
Because the Ph.D. program is heavily based on independent research, each student must write a proposal describing his/her proposed dissertation research following the technical guidelines established by the department. Upon approval of the student's dissertation proposal, the advisory committee will recommend the student's admission to candidacy. This is subject to the approval of the Dean of the Graduate School.

Upon completion of a substantial amount of graduate work and in no case later than two weeks prior to the beginning of the semester in which the student expects to complete all requirements for the degree, the student shall file for Admission to Candidacy on a form supplied by The Graduate School. This application is a checklist approved by the advisor, department chair, and the College Dean listing all coursework to be offered for the degree (including transfer credit and courses in progress). A tentative date for the dissertation defense should be agreed upon by the candidate and chair and indicated on this application. The date should be realistic and allow ample time for completion and review of the dissertation.

Dissertation
Evidence of a high degree of competence in scholarship, written exposition, independent inquiry and the ability to organize and apply knowledge must be demonstrated by the student in the dissertation. The student will make a public defense of the dissertation at which time the dissertation, as well as the student's knowledge of the field, will be appropriate matter for examination by the student's advisory committee. Although questions may be asked by the general audience, evaluation of the dissertation defense is the sole responsibility of the advisory committee. The dissertation will be graded on a Pass/Unsatisfactory basis.

Assistantships
Teaching and research assistantships are available on a competitive basis.

Tuition Waivers
In-state and Out-of-state tuition waivers are available, on a competitive basis, to full time students with financial assistantships from UNC Charlotte.

Time Limit
Students are allowed a maximum of eight (8) calendar years from formal admission to the Ph.D. program to complete the program successfully.

Courses in Mechanical Engineering and Engineering Science

MEGR 6090. Special Topics. (1-6) (For Post-Baccalaureate Students only) Directed study of current topics of special interest. May be repeated for credit. *(On Demand)*

MEGR 6116. Fundamentals of Heat Transfer and Fluid Flow. (3) Prerequisite: MEGR 3114 or consent of the department. A unified treatment of transfer operations developed in terms of physical rate processes; formulation and solution of typical boundary value problems associated with heat, mass and momentum transfer. *(Spring)*

MEGR 6125. Vibrations of Continuous Systems. (3) Prerequisite: MEGR 4143. Analysis of vibration of continuous linear elastic structures such as strings, rods, beams and plates with varying boundary conditions. Approximate solution techniques such as Rayleigh, Rayleigh-Ritz and Galerkin are presented. *(Spring)*

MEGR 6141. Theory of Elasticity I. (3) Prerequisite: MEGR 3221 or consent of the department. Introduction to the theory of elastic media; the fundamentals of stress, strain, stress-strain relationships, compatibility and equilibrium. Applications to two- and three-dimensional problems. Structural mechanics and energy methods. *(Fall)*

MEGR 6166. Mechanical Behavior of Materials I. (3) Prerequisite: MEGR 3161 or equivalent or consent of the department. Macroscopic and microscopic aspects of elastic and plastic deformation and fracture of engineering materials; applications of dislocation theory to an interpretation and control of mechanical properties; temperature, strain rate and texture effects. *(Spring)*

MEGR 6181. Engineering Metrology. (3) Prerequisite: MEGR 3282. Introduction to metrology and standards. Uncertainty, precision and accuracy in metrology. Measurement of size and form, computational methods in measurement of form. Measurement of surface texture and out of roundness. Machine tool and robot accuracy and calibration. Evaluation of screw threads and gears. Introduction to design of precision instruments. *(Fall)*

MEGR 6990. Industrial Internship. (1-3) Prerequisite: Completion of nine hours of graduate coursework. Full- or part-time academic year internship in engineering complementary to the major course of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by their graduate program director. Requires a mid-term report and final report to be graded by the supervising faculty. *(On demand)*

MEGR 7090. Special Topics. (1-6) Directed study of current topics of special interest for Master's degree. May be repeated for credit *(On Demand)*

MEGR 7101. Transport Processes. (3) Prerequisite: consent of the department. Unified field theory approach to the fluid transport of momentum, energy, mass and electrical charge. Statistical theories of turbulence and molecular transport. Multiphase systems, chemically reacting flows, ionized fluids, separation processes. *(On Demand)*

MEGR 7102. Introduction to Continua. (3) Prerequisites: MEGR 2144, MEGR 3114, or consent of department. A unified treatment of those topics which are common to all continua. Stress, deformation and velocity fields, constitutive equations and field equations. Representative applications in solid, fluid and electromagnetic continua, including interaction problems. *(On Demand)*

MEGR 7108. Finite Element Analysis and Applications. (3) Prerequisites: MEGR 6141 and MATH 6171 or permission of the department. An introduction to the finite element method and its application to engineering problems. Application of the displacement methods to plane stress, plane strain, plate bending and axisymmetrical bodies. Topics may include but are not limited to: dynamics, heat conduction, and structural mechanics. *(Spring)*

MEGR 7110. Advanced Conductive Heat Transfer. (3) Prerequisite: MEGR 3116. Theory of steady and unsteady heat conduction in isotropic and anisotropic media. Treatment of concentrated and distributed heat sources. Application of the finite difference and finite element methods. *(Fall)*

MEGR 7111. Advanced Engineering Thermodynamics. (3) Prerequisites: MEGR 3112 and MATH 3142. Postulational treatment of the laws of thermodynamics. Equilibrium and maximum entropy postulates. Development of formal relationships and principles for general systems. Applications to chemical, magnetic, electric, and elastic systems. *(On Demand)*

MEGR 7112. Radiative Heat Transfer. (3) Prerequisite: MEGR 3116. Fundamentals of radiation heat transfer, analysis of gray body and wavelength dependent systems; radiation from gases at high temperature, and particulate-laden gases; combined radiation and conduction. *(On Demand)*

MEGR 7113. Dynamics and Thermodynamics of Compressible Flow. (3) Prerequisites: MEGR 3111 and 3114. Compressible flow equations, isentropic flow, normal shock waves, Fanno and Rayleigh line flows. Nonsteady one dimensional flow. *(Alternate Years)*

MEGR 7114. Advanced Fluid Mechanics. (3) Prerequisite: MEGR 4112 or consent of the department. Unified tensorial-theoretical treatment of the transport of mass, momentum, energy and voracity in fluids. General theorems for inviscid and irrational flows. Viscous effects, boundary layer theory, nonlinear phenomena hydrodynamic instability and turbulence with applications. *(On Demand)*

MEGR 7115. Convective Heat Transfer. (3) Prerequisites: MEGR 3116 and MEGR 4112. Heat and momentum transfer prediction in channel flows and boundary layers. Differential equation methods for fully developed and entry length laminar tube flows. Similarity solution for laminar heat transfer. Superposition methods for non-uniform boundary conditions. Integral equations of the boundary layer, approximate and semiempirical methods of solution. *(Spring)*

MEGR 7118. Thermal Environmental Engineering. (3) Prerequisite: MEGR 3116. Application of the thermodynamic and heat transfer principles to the analysis of thermal environmental systems. Topics include thermodynamic properties of moist air, psychometric charts, transfer processes, heating and cooling of moist air

coils, physiological effects of thermal environments, food processing and storage *(Alternate Years)*

MEGR 7119. Thermal Applications in Biomedical Engineering. (3) Prerequisite: consent of the department. Application of thermodynamic and heat transfer principles to the analysis of biomedical systems. Topics include thermodynamic and transport properties of biological tissue, thermoregulation, design and use of cryosurgical probes, and numerical modeling methods. *(On Demand)*

MEGR 7120. Bearing Design and Lubrication. (3) Prerequisite: MEGR 3222 or consent of the department. Hydrodynamic lubrication, fluid film and rolling element bearings, design and control of gas and fluid lubricated bearings. *(On Demand)*

MEGR 7121. Mechanism Analysis. (3) Prerequisite: MEGR 3221 or consent of the department. Analysis of coplanar and spatial mechanisms, application of matrix methods in analysis of mechanisms, mobility analysis of mechanisms, rigid body guidance, computer aided analysis of mechanisms. *(Spring) (Evenings)*

MEGR 7122. Mechanism Synthesis. (3) Prerequisite: MEGR 7121 or consent of the department. Synthesis of coplanar and spatial mechanisms, number and type synthesis, function generator, path generator, optimal synthesis of mechanisms, case studies in optimal design of mechanisms *(Alternate Years).*

MEGR 7123. Mechanical Design. (3) Prerequisite: MEGR 6141 or consent of the department. Impact loading on critical sections, fatigue consideration, stress concentration, fluctuating stresses, failure analysis, contact stresses, industrial case studies *(Alternate Years)*

MEGR 7124. Introduction to Automatic Controls. (3) Prerequisite: consent of the department. Emphasis on mechanical systems. Mathematical models and characteristics of control systems. Performance and stability of linear feedback systems. Root locus and frequency response techniques. State space methods. Design and compensation of control systems. *(Spring)*

MEGR 7126. Dynamics of Machinery. (3) Prerequisite: MEGR 3222 or consent of the department. Application of dynamics of machinery, balancing of rigid and flexible rotors. Dynamics of spatial mechanisms. Computer-aided dynamic analysis of machinery. *(On Demand)*

MEGR 7127. Computer-Aided Manufacturing. (3) Prerequisite: MEGR 3255 or consent of the department. Topics covered include flowline production, numerical control, computer aided process monitoring and control, group technology, flexible manufacturing, and material requirement planning. *(Alternate Years)*

MEGR 7128. Control of Robotic Manipulators. (3) Prerequisite: MEGR 4127 or ECGR 4151. Control of industrial robots including linear, nonlinear, and adaptive control of the motion of robots; plus control of forces and torques exerted by the end-effector. Additional topics include computer animation of the controlled behavior of industrial robots, actuators and sensors, robot vision and artificial intelligence, and control computer/robot interfacing (dual-listed with ECGR 5151). *(Spring)*

MEGR 7129. Structural Dynamics of Production Machinery. (3) Prerequisite: consent of the department. The analytical study of dynamic characteristics of production machinery and the corresponding measurement, specification, and effects on machine performance. Machine tool vibration, machine tool stability, high speed machining. *(Spring)*

MEGR 7142. Theory of Elasticity II. (3) Prerequisite: MEGR 6141 and MATH 6172. Continuation of MEGR 6141 with additional topics in three-dimensional analyses. Topics include complex variable techniques, variational methods and numerical techniques. *(On Demand)*

MEGR 7143. Inelastic Behavior of Materials. (3) Prerequisite: MEGR 6141 or consent of the department. Introduction to plasticity and linear viscoelasticity. Topics include a study of yield criteria, plastic stress-strain relations, plastic hinge analysis, discrete viscoelastic models, the hereditary integral and selected boundary value problems *(Alternate Years)*

MEGR 7145. Advanced Topics in Dynamics. (3) Prerequisite: consent of the department. Selected advanced topics in dynamics such as Lagrangian dynamics, vibrations of continuous media, stress wave propagation and motion measurement. *(On Demand)*

MEGR 7146. Experimental Stress Analysis. (3) Prerequisite: MEGR 6141 or consent of the department. Theoretical and experimental techniques of stress and strain analysis, with experimental emphasis on strain gages and instrumentation. Brittle coatings and photoelasticity are also considered. Two lectures and a two-hour lab per week. *(Alternate Years)*

MEGR 7161. Atomic Processes in Solids. (3) Prerequisite: MEGR 2144 or consent of the department. Processes dependent on large- and small-scale atomic motions leading to changes in material structures and properties. Theories of diffusion controlled and diffusionless transformations. Modern concepts in structure and property control. *(On Demand)*

MEGR 7164. Diffraction/Spectroscopic Studies of Matter. (3) Prerequisite: consent of the department. Atomic arrangements in crystalline and non-crystalline forms of matter. Symmetry properties of crystals. Treatment of diffraction theory and experimental

methods. X-ray diffraction and spectroscopic analysis of matter. *(Alternate Years)*

MEGR 7165. Diffraction and NDE Methods in Materials Science. (3) Prerequisites: MEGR 3161 or equivalent or consent of the department. Principles of diffraction and non-destructive evaluation methods and their applications to material problems; characterization of atomic and microstructural features and process induced defects in materials; evaluation of residual stress and texture effects; phase and elemental analysis; experimental methodologies. *(On Demand)*

MEGR 7166. Deformation and Fracture of Materials. (3) Prerequisite: consent of the department. Macroscopic and microscopic aspects of elastic and plastic deformation and fracture; applications of dislocation theory to an interpretation and control of mechanical properties; temperature, strain rate and texture effects. *(On Demand)*

MEGR 7167. Mechanical Behavior of Materials II. (3) Prerequisite: MEGR 6166 or equivalent. Continuation of MEGR 6166; selection of topics to include further treatments of dislocation theory and its applications; analysis of fatigue and creep phenomena; strength of polymers and composites; statistical treatment of strength; materials design and failure analysis. *(Spring)*

MEGR 7172. Computational Methods in Engineering. (3) Prerequisite: MATH 6171 or consent of the department. Numerical linear algebra, solution of systems of equations, numerical integration, differentiation and interpolation, root finding, numerical solution of partial differential equations by finite difference and finite element methods. *(On Demand)*

MEGR 7182. Machine Tool Metrology. (3) Prerequisites: MEGR 2180, MEGR 3281, and MEGR 6181. Machine tool accuracy and performance testing. Modeling and measurement of volumetric accuracy using parametric error separation and quasi-static error models. Use of homogeneous transformations for error mapping. Linear and higher order thermal models. Error budgeting and management. Axis of rotation metrology, spindle accuracy, and cutting performance tests. Laboratory experience on CNC machine tools using heterodyne laser interferometers, capacitance gages, and other computer assisted sensor systems for machine checking. *(Spring)*

MEGR 7183. Design of Precision Machines and Instruments I. (3) Prerequisites: MEGR 3221 and MEGR 7182. Basic patterns in the design of precision machines and instruments. Design process, error assessment and examples, materials, sensors, drives, and controls for precision machines. Machine frames, sliding and rolling element bearings, flexures, hydrostatic bearings. Design methodology, analysis of potential design, design case studies, and modeling of design alternatives. *(Fall)*

MEGR 7184. Design of Precision Machines and Instruments II. (3) Prerequisites: MEGR 7183. Application of principles, methodology, and analysis to specific design problems. Management of design. Class will design machine components, subsystems or whole instruments either individually or as members of design teams. Critical design reviews will be conducted. Designs will be quantitatively analyzed for conformance to design specifications and intent. *(Spring)*

MEGR 7281. Theory and Application of Computer-Aided Tolerancing. (3) Prerequisite: consent of the department. Theory of geometric tolerance representation, analysis, and synthesis. Applications of geometric tolerances for design function and efficient metrology. Laboratory experience with mechanical design and tolerance analysis software. Implementation projects for tolerance analysis and synthesis. *(Fall, Alternate Years)*

MEGR 7282. Computer-Aided Process Planning. (3) Prerequisite: consent of the department. Theory and computing methods for the specification, manufacture, and verification of manufactured artifacts with a particular emphasis on precision engineering applications. Representation of engineering designs. Feature recognition. Generation of manufacturing and metrology instructions. Computer software implementation projects. *(Fall, Alternate Years)*

MEGR 7283. Advanced Coordinate Metrology. (3) Prerequisite: MEGR 6181 or consent of the department. Error compensation of coordinate measuring machines, algorithms and sampling methods used in data analysis. Probing systems, compensation of probing errors. Scanning coordinate measuring machines and their dynamic behavior. Performance testing of coordinate measuring machines. *(Spring, Alternate Years)*

MEGR 7284. Advanced Surface Metrology. (3) Prerequisite: MEGR 6181 or consent of the department. Constituents of surface texture, stylus, optical, atomic force microscope and other advanced methods of measuring surface texture. Two and three dimensional measurement of surfaces. Separation of form, waviness and roughness. Random process analysis techniques, use of transforms for filtering. Numerical evaluation of surface texture. Use of surface texture as fingerprint of the process. Relationship between function and surface texture. *(Spring, Alternate Years)*

MEGR 7380. Tribology. (3) Prerequisite: consent of the department. Surface properties and study of surfaces in contact. Friction and wear of materials. Tribological properties of solid materials. Fluid lubricated journal bearings, lubrication of highly loaded contacts, lubricating systems and bearing selection. *(On Demand)*

MEGR 7480. Advanced Manufacturing Processes and Equipment. (3) Prerequisite: consent of the department. Detailed analytical treatment of

manufacturing materials and processes. Forming processes (forging, extrusion, rolling, drawing, bending, shearing), casting processes, metal cutting processes (turning, boring, drilling, shaping, milling), tool materials, joining processes, automation. *(On Demand)*

MEGR 7892. Individual Study and Projects. (1-6) Individual investigation and exposition of results. May be repeated for credit. *(On Demand)*

MEGR 7893. Advanced Topics in Precision Engineering. (3) Prerequisite: consent of the department. Selected topics in precision control, materials for precision engineering, precision manufacturing, precision measurement, advanced analytical and numerical methods used in precision engineering (may be repeated as the topics vary and with the approval of the department). *(On Demand)*

MEGR 7991. Graduate Master Thesis Research. (1-6) Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit *(Fall, Spring)*

MEGR 7999. Graduate Residence. (1) Required of all master's students not enrolled in other graduate courses who are working on or defending thesis/projects and/or are scheduled for comprehensive examinations. *(Fall/Spring)*

<u>8000 level courses are for Ph.D. students only</u>
MEGR 8090. Special Topics. (1-6) Directed study of current topics of special interest for Ph.D. degree. May be repeated for credit *(On Demand)*

MEGR 8101. Transport Processes. (3) See MEGR 7101 for Course Description.

MEGR 8102. Intro to Continua. (3) See MEGR 7102 for Course Description.

MEGR 8108. Finite Element Analysis and Applications. (3) See MEGR 7108 for Course Description.

MEGR 8110. Advanced Conductive Heat Transfer. (3) See MEGR 7110 for Course Description.

MEGR 8111. Advanced Engineering Thermodynamics. (3) See MEGR 7111 for Course Description.

MEGR 8112. Radiative Heat Transfer. (3) See MEGR 7112 for Course Description.

MEGR 8113. Dynamics and Thermodynamics of Compressible Flow. (3) See MEGR 7113 for Course Description.

MEGR 8114. Advanced Fluid Mechanics. (3) See MEGR 7114 for Course Description.

MEGR 8115. Convective Heat Transfer. (3) See MEGR 7115 for Course Description.

MEGR 8116. Fundamentals of Heat Transfer and Fluid Flow. (3) See MEGR 6116 for Course Description.

MEGR 8118. Thermal Environmental Engineering. (3) See MEGR 7118 for Course Description.

MEGR 8119. Thermal Applications in Biomedical Engineering. (3) See MEGR 7119 for Course Description.

MEGR 8120. Bearing Design and Lubrication. (3) See MEGR 7120 for Course Description.

MEGR 8121. Mechanism Analysis. (3) See MEGR 7121 for Course Description.

MEGR 8122. Mechanism Synthesis. (3) See MEGR 7122 for Course Description.

MEGR 8123. Mechanical Design. (3) See MEGR 7123 for Course Description.

MEGR 8124. Introduction to Automatic Controls. (3) See MEGR 7124 for Course Description.

MEGR 8125. Vibrations of Continuous Systems. (3) See MEGR 6125 for Course Description.

MEGR 8126. Dynamics of Machinery. (3) See MEGR 7126 for Course Description.

MEGR 8127. Computer-Aided Manufacturing. (3) See MEGR 7127 for Course Description.

MEGR 8128. Control of Robotic Manipulators. (3) See MEGR 7128 for Course Description.

MEGR 8129. Structural Dynamics of Production Machinery. (3) See MEGR 7129 for Course Description.

MEGR 8141. Theory of Elasticity I. (3) See MEGR 6141 for Course Description.

MEGR 8142. Theory of Elasticity II. (3) See MEGR 7142 for Course Description.

MEGR 8143. Inelastic Behavior of Materials. (3) See MEGR 7143 for Course Description.

MEGR 8145. Advanced Topics in Dynamics. (3) See MEGR 7145 for Course Description.

MEGR 8146. Experimental Stress Analysis. (3) See MEGR 7146 for Course Description.

MEGR 8161. Atomic Processes in Solids. (3) See MEGR 7161 for Course Description.

MEGR 8164. Diffraction/Spectroscopic Studies of Matter. (3) See MEGR 7164 for Course Description.

MEGR 8165. Diffraction and NDE Methods in Materials Science. (3) See MEGR 7165 for Course Description.

MEGR 8166. Mechanical Behavior of Materials I. (3) See MEGR 6166 for Course Description.

MEGR 8167. Mechanical Behavior of Materials II. (3) See MEGR 7167 for Course Description.

MEGR 8168. Deformation and Fracture of Materials. (3) See MEGR 7166 for Course Description.

MEGR 8172. Computational Methods in Engineering. (3) See MEGR 7172 for Course Description.

MEGR 8182. Machine Tool Metrology. (3) See MEGR 7182 for Course Description.

MEGR 8183. Design of Precision Machines and Instrument I. (3) See MEGR 7183 for Course Description.

MEGR 8184. Design of Precision Machines and Instrument II. (3) See MEGR 7184 for Course Description.

MEGR 8281. Theory and Application of Computer-Aided Tolerancing. (3) See MEGR 7281 for Course Description.

MEGR 8282. Computer-Aided Process Planning. (3) See MEGR 7282 for Course Description.

MEGR 8283. Advanced Coordinate Metrology. (3) See MEGR 7283 for Course Description.

MEGR 8284. Advanced Surface Metrology. (3) See MEGR 7284 for Course Description.

MEGR 8380. Tribology. (3) See MEGR 7380 for Course Description.

MEGR 8480. Advanced Manufacturing Processes and Equipment. (3) See MEGR 7480 for Course Description.

MEGR 8892. Individual Study and Projects. (1-6) See MEGR 7892 for Course Description.

MEGR 8893. Advanced Topics in Precision Engineering. (3) See MEGR 7893 for Course Description.

MEGR 8990. Industrial Internship. (1-3) See MEGR 6990 for Course Description.

MEGR 8999. Doctoral Dissertation Research. (1-9) Individual investigation culminating in the preparation and presentation of a doctoral dissertation.*(On Demand)*

MEGR 9999. Doctoral Residence. (1)

College of Health and Human Services

In the College of Health and Human Services at the University of North Carolina at Charlotte, students and faculty help chart the course for health care and social services throughout the region. With excellence in educational programs, research, community service, and clinical practice, the college plays an important role in developing and implementing high quality health care and social service practices. As an interdisciplinary college, many opportunities for collaborative teaching and research by students and faculty are available. Within the college's educational programming, faculty and student research is a key component to successful learning outcomes. Additionally, the college incorporates information technology standards in all courses and offers online learning opportunities in many graduate programs.

Graduate Degree Programs

Master of Health Administration
Master of Science in Clinical Exercise Physiology
Master of Science in Health Promotion
Master of Science in Nursing: Adult Nurse Practitioner/Clinical Nurse Specialist (ANP/CNS)
Master of Science in Nursing: Community Health Nursing
Master of Science in Nursing: Family Nurse Practitioner
Master of Science in Nursing: Family Nurse Practitioner School Nurse
Master of Science in Nursing: Nurse Anesthesia
Master of Science in Nursing: Adult Psychiatric Mental Health Nursing
Master of Science in Nursing and Master of Health Administration
Master of Social Work

Graduate Non-Degree Programs

Certificate in Clinical Exercise Physiology
Certificate in Community Health Promotion
Certificate in Nurse Anesthesia (Post-Master's Certificate)
Certificate in Nursing Education (Post-Master's Certificate)
Certificate in Nursing Administration (Post-Master's Certificate)
Certificate in Nursing: Family Nurse Practitioner (Post-Master's Certificate)
Certificate in Nursing: ANP/CNS (Post-Master's Certificate)

CLINICAL EXERCISE PHYSIOLOGY

Department of Kinesiology

Belk Gym 226A
704-687-4695
http://www.health.uncc.edu/knes

Degree

M.S., Graduate Certificate

Coordinator

Michael J. Turner, Associate Professor

Graduate Faculty

Alan Jung, Assistant Professor
J. Timothy Lightfoot, Professor
Michael Turner, Assistant Professor
Melissa Wdowik, Lecturer

MASTER OF SCIENCE IN CLINICAL EXERCISE PHYSIOLOGY

The Masters of Science in Clinical Exercise Physiology is designed to prepare students to become Registered Clinical Exercise Physiologists. Clinical Exercise Physiologists are employed in inpatient and outpatient clinical/rehabilitation settings (e.g. Cardiopulmonary Rehab programs), general wellness/fitness commercial and corporate settings, and industrial settings that provide health care services for both diseased and healthy populations. Through a blend of classroom instruction and clinical experience, the degree program teaches a wide variety of specific health care skills, knowledge, and behaviors within the cardiovascular, pulmonary, metabolic, musculoskeletal, neuromuscular, and immunologic practice areas. Students will be required to complete a 30 credit hour core of classes and an additional 6 credit hours of electives. **A complete sequence of courses can be found at http://www.health.uncc.edu/knes.**

Additional Admissions Requirements

1) Satisfactory scores on either the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT).
2) Cumulative GPA of 3.0 or better in all college course work completed in the Junior and Senior year of their undergraduate program;
3) Successful completion (grade of C or better) of a minimum of 4 credit hours of Anatomy and

Physiology, 3 credit hours of Exercise Physiology, and 3 credit hours of Exercise Prescription.

Degree Requirements

The program requires a minimum of 36 semester hours of graduate credit including 24 hours of core courses, a minimum of 3 hours of Clinical Practicum, 6 hours of electives, and 3 hours of either Thesis or additional clinical practicum.

Assistantships

Positions as a research assistant or teaching assistant may be available. Grant funded assistantships may be available as well. Students seeking assistantships should contact the Graduate Coordinator of the Clinical Exercise Physiology program. In general, graduate assistantship awards for the academic year are made by the preceding April 15.

Clinical Practicum

As a part of the curriculum, each student must complete, ***at a minimum,*** 3 hours of Clinical Practicum. Students, if they choose the Comprehensive Exam option as their capstone experience, are required to complete an additional 3 hours of Clinical Practicum. Each Practicum credit is equivalent to 200 clinical hours. Clinical practicum usually begin in the second semester of the student's program and are arranged through the Practicum Supervisor within the Department of Kinesiology.

Core Courses (24 hours)

KNES6120 Advances in Clinical Exercise Physiology (3) - Fall
KNES5134 Advanced Exercise Testing and Prescription (3) – Spring
KNES6280 Advanced Exercise Physiology (3) – Spring
KNES6121 Clinical Practice in Exercise Physiology (3) - Fall
NURS6160 Research Methods in Health Professions (3) – Fall, Spring, Summer
KNES5292 Clinical Athletic Training (3) – Summer
KNES5232 Physiology of Human Aging (3) – Fall
KNES6285 Advanced Cardiopulmonary Physiology (3) - Spring

Clinical Practicum (3-6 hours)

KNES 6490 Advanced Practicum in Clinical Exercise Physiology (1) (taken at least 3 times)

Capstone Experience (student is required to complete one of two options) (3 hours)

OPTION A - KNES6900 Graduate Thesis (3)
OPTION B - KNES6490 Advanced Practicum in CEP (1) (taken for an additional 3 credits) AND
satisfactory completion of comprehensive examination

Elective Courses (at least 6 hours)

KNES6899 Special Topics in Exercise Physiology (3)
KNES6469 Directed Independent Study (3)
HLTH5299 Epidemiology (3)
HLTH6222 Health Promotion Analysis (3)
BIOL5199 Molecular Biology (3)
BIOL5171 Cell Physiology (3)
BIOL6050 Advanced Human Physiology (Special Topics) (3)
BIOL6050 Pathophysiology (Special Topics) (3)
BIOL5260 Population Genetics (3)

Capstone Experience

Near the completion of the program of study, each student is required to select either a research thesis or advanced clinical practice that demonstrates a contribution to professional practice or knowledge through systematic evaluation or investigation. The student is responsible for organizing a committee of three faculty members (and an outside community person if appropriate) to supervise, monitor and evaluate the project or thesis.

Advising

Upon acceptance into the program, an academic advisor is assigned to each student. Students are expected to meet with their advisors on a regular basis to plan their progression through their program of study. Any course substitution must be approved by the academic advisor.

Research Opportunities/Experiences

A range of research opportunities exist in the Department of Kinesiology for qualified students. Students are encouraged to become engaged in the research focus of the department.

Tuition Waivers

Tuition waivers may be available through a variety of sources. Students interested in pursuing tuition waivers should contact the Graduate Coordinator in the Spring semester *prior* to enrolling for Fall courses.

Financial Aid/Financial Assistance

A wide range of opportunities for financial aid/assistance is available to qualifying students, which may be accessed through the financial aid office. See the financial information section of this graduate catalog for more information on the opportunities that are available, and how to contact the financial aid office.

Program Certifications/Accreditations

Completion of the clinical exercise physiology specialty qualifies the graduate to take the Clinical Exercise Physiology Registry Examination (RCEP) administered by the American College of Sports Medicine.

GRADUATE CERTIFICATE IN CLINICAL EXERCISE PHYSIOLOGY

The Graduate Certificate Program in Clinical Exercise Physiology contributes to the preparation of an allied health practitioner to sit for the Registered Clinical Exercise Physiologist national exam.

Admission Requirements

Students are admitted to the Graduate School in a special category for certificate programs. See general information on admission to graduate certificate programs elsewhere in this Catalog.

Certificate Requirements

The Graduate Certificate in Clinical Exercise Physiology requires 15 hours in the following approved courses: KNES 5134 (Assessment and Development of Physical Fitness), KNES 6280 (Advanced Exercise Physiology), KNES 5232 (Physiology of Human Aging), KNES 5292 (Advanced Athletic Training), KNES 6121 (Clinical Practice in Exercise Physiology).

Transfer Credit

Transfer credits are not accepted in the Certificate program. For more information about the Certificate program contact the Department of Kinesiology.

COURSES IN CLINICAL EXERCISE PHYSIOLOGY (KINESIOLOGY)

KNES 5130. Applied Nutrition for Today's Consumer. (3) Principles of nutrition, dietary guidelines, dietary relationships to diseases and health, special populations, computerized dietary analysis. *(Cross-listed with HLTH 5130 – On demand)*

KNES 5134. Assessment and Development of Physical Fitness. (3) Prerequisite: consent of the instructor. Study of responses and adaptations to exercise, assessment techniques, exercise prescription, leadership and programming. *(Spring)*

KNES 5232. Physiology of Human Aging. (3) This course focuses on the normal physiological alterations that occur as the human progresses from a young adult to the latter stages of life. Special attention is given to interventions commonly promoted to combat the physiological changes that result from aging. *(Fall)*

KNES 5292. Clinical Athletic Training. (3) Advanced study of the clinical applications of common therapeutic modalities and rehabilitation in the treatment of athletic related injuries. *(Summer)*

KNES 6120. Advances in Clinical Exercise Physiology. (3) This course introduces students to concepts and topics associated with Clinical Exercise Physiology, including areas of practice in Clinical Exercise Physiology and professional development. *(Fall)*

KNES 6121. Clinical Practice in Exercise Physiology. (3) Knowledge and skills required in the clinical setting including operational standards, examination of current drug therapies, and legal and social considerations related to practice as a Clinical Exercise Physiologist. *(Spring)*

KNES 6280. Advanced Exercise Physiology. (3) Prerequisite: KNES 2280 or similar coursework. Advanced study of the functioning of physiological systems during exercise with emphasis on current literature and research. *(Spring)*

KNES 6285. Advanced Cardiopulmonary Physiology. (3) This course is designed to develop a thorough understanding of cardiovascular physiology, ECG interpretation, and health-related applications. This course examines in detail, the various parameters of the cardiovascular system, the implication of disease and structural abnormalities to these parameters, and the relationship of cardiovascular function to exercise adaptation. Emphasis will be placed on usage of the information in the clinical setting. *(Fall)*

KNES 6490. Advanced Practicum in Clinical Exercise Physiology. (1) Acquisition and application of knowledge, skills, and abilities necessary for the Registered Clinical Exercise Physiologist while gaining experiential hours in an appropriate clinical setting. Three (3) credit hours of Advanced Practicum are required for graduation; this course may be repeated for up to 6 credit hours. *(Every Semester)*

KNES 6469. Directed Independent Study. (1-3) Directed study in areas of specialization in Clinical Exercise Physiology and related fields. Offered on a *Pass/No Credit* basis only. *(Every Semester)*

KNES 6899. Special Topics in Kinesiology. (1-6) Topics and special problems related to issues, practices or sufficient trends in Kinesiology. Institutes, workshops, seminars and independent studies. *(Every Semester)*

KNES 6900. Research and Thesis in Kinesiology. (3) Prerequisite: Satisfactory completion of research design course; completion of at least 24 hours of graduate program; consent of instructor overseeing thesis research. Design, implementation, presentation, and evaluation of an approved research project in student's specialty area. The applied project is of the student's own design under the supervision of an advisor and graduate committee. Graded Pass/No Credit only. *(Every semester)*

KNES 7999. Graduate Residence. (1) Independent research. Required of all master's degree students who are

working on a thesis but not enrolled in other graduate courses. *(Every Semseter)*

HEALTH ADMINISTRATION

Department of Health Behavior and Administration

Bernhard 225
704-687-3594
http://www.health.uncc.edu/academic_programs.cfm?pname=mha

Degree

M.H.A.

Director

Lutchmie Narine, Associate Professor

Graduate Faculty

William Brandon, Distinguished Professor
Sonya Hardin, Associate Professor
Lutchmie Narine, Associate Professor
Gerald Pyle, Professor Emeritus
Rosemarie Tong, Distinguished Professor
Jennifer Troyer, Associate Professor

Professional Affiliates

Peggy Burke, M.B.A., Director of Corporate Audit, Novant Health
Betsy Walsh J.D., M.P.H., Senior Special Counsel, Novant Health
J. Bennet Waters, Jr. M.P.H., D.H.A., Vice President of Operations, Piedmont Healthcare Management Group

MASTER OF HEALTH ADMINISTRATION

The Master of Health Administration (MHA) degree prepares students for exciting careers in health services management for a variety of health related institutions in an evolving health care delivery system. Structured to meet the highest professional and accreditation standards the program is designed to address the needs of current health care managers, clinical professionals who anticipate future administrative responsibilities, and pre-professionals who wish to prepare for an entry level career in health care administration.

The Master of Health Administration is a 51 hour degree program. Students take 45 hours of core courses including a 3 credit hours internship, and 6 hours of elective courses. Administratively located within the Department of Health Behavior and Administration, it is an interdisciplinary program with courses taught by faculty from the College of Arts and Sciences, the Belk College of Business Administration and the College of Health and Human Services.

Students may enroll in the Master of Health Administration program on a full-time or part-time basis. Classes are scheduled in the evenings, and on weekends mainly at UNC Charlotte Uptown, and for selected courses at the UNC Charlotte main campus.

Masters prepared health service managers may work as chief or executive administrators, assistants to chief executives, or as directors and mangers of departments and units. Some examples of the settings where MHA graduates work include: hospitals and hospital systems, physician practices and clinics, long term care facilities, managed care organizations, consulting firms, pharmaceutical and biotechnology companies, local/state/federal health agencies, health insurance companies, and medical supply and equipment manufacturers.

Additional Admission Requirements

To be considered for admission to graduate study in Health Administration, a student must present the following requirements in addition to those required by the Graduate School.

1) Acceptable scores on the verbal and quantitative portions of the Graduate Record Exam (GRE) or the Graduate Management Admission Test (GMAT).
2) An essay describing the applicant's experience and objective in undertaking graduate study in health administration.
3) Basic computer skills including word processing and use of spread sheets.

Applicants with a variety of undergraduate degree specializations have the potential to be successful in the program. Individuals with records of high quality professional experience who do not fulfill the formal requirements should discuss with the Director of the Health Administration Program other factors that may have a bearing on admission.

Degree Requirements

Courses

Each student is required to complete 45 hours (15 courses including the Internship) in the core curriculum. These courses offer a basic body of knowledge, skills and values relevant to health services administration. Additionally, students will select 6 credit hours (2 graduate courses) in elective studies. A student may choose to use the two elective courses to complete a thesis. Students are encouraged to select courses that meet individual professional needs. Electives are available in several areas including management specialties, long

term care, community health, and non-profit organization.

Core Courses (45 hours)

HADM6100 Introduction to the US Health Care System (3)
HADM6104 Health and Disease (3)
HADM6108 Decision Analysis in Health Care (3)
HADM6116 Accounting for Health Care Management (3)
HADM6120 Health Economics (3)
HADM6124 Marketing in Health Care (3)
HADM6128 Human Resources Management (3)
HADM6134 Quality and Outcomes Management in Health Care (3)
HADM6138 Health Care Finance (3)
HADM6142 Health Policy Development (3)
HADM6145 Organization Behavior in Health Care (3)
HADM6146 Information Resources Management (3)
HADM6150 Health Law and Ethics (3)
HADM6154 Strategic Management of Health Services Organizations (3)
HADM6400 Internship (3)

Sample Electives (6 hours)

HADM6200 Health Insurance and Managed Care (3)
HADM6212 Health, Aging and Long Term Care (3)
HADM6216 Long Term Care Administration (3)
HADM6204 Trends and Issues in Health Administration (3)
GRNT6211 Administration of Aging Programs (3)
SOCY6138 Social Organization of Health Care (3)

Assistantships

Positions as a graduate administrative assistant may be available. Grant funded assistantships may be available as well. Students seeking assistantships should contact the Office Assistant assigned to the Department of Health Behavior and Administration.

Internships

Each student in the program is required to demonstrate professional experience in the health care delivery system. This requirement may be demonstrated through 1) a full-time administrative position in a health care delivery setting, or 2) an approved internship in a health care delivery administrative setting. Students who have no professional experience in a health care setting are required to undertake an internship experience. Each student must complete an MHA Internship Information form, describing professional experience or internship preference, and submit it to the Director of the MHA Program. Students who require an internship register for HADM 6400 Internship on a pass/fail basis. Students who obtain an exemption from completing an internship are required to take an elective course as a substitute in order to complete the 51 hours needed to graduate.

Electives

Students will enroll in two elective courses and are encouraged to select courses that will complement their professional interest and educational goals. Elective courses are offered each semester by the Health Administration program or may be selected from other graduate programs to meet particular student interest.

Advising

The Director of the MHA Program is the advisor for all students. Students are expected to meet with the MHA Director on a regular basis to plan their progression through their program of study. Any course substitutions and selection of electives must be approved by the MHA Director. With the approval of the MHA Director students may have other MHA graduate faculty serve as their academic advisor.

Thesis

Students may elect a two-course thesis sequence to produce and defend independent research relevant to health services administration that demonstrates a contribution to professional knowledge through systematic investigation. This course requires permission of the graduate faculty member who would direct the study as well as permission of the Director of the MHA Program prior to registration.

Financial Aid/Financial Assistance

A wide range of opportunities for financial aid/assistance is available to qualifying students, which may be accessed through the financial aid office. See the financial information section of this *Graduate Catalog* for more information on the opportunities that are available, and how to contact the financial aid office.

MSN/MHA Dual Degree

The Health Administration Program and the Graduate Nursing Program offer an integrated curriculum leading to a dual degree, both the MHA and the MSN. Applicants must hold a B.S.N. degree and must be admitted to both programs. The program is described in detail under graduate programs in the School of Nursing.

Courses in Health Administration

HADM 6000. Topics in Health Administration. (3) Intensive study of a topic in health administration. The topic of investigation may vary from semester to semester. May be repeated for credit. *(On demand)*

HADM 6100. Introduction to the US Health Care System. (3) Overview of health care delivery in the United States including organizational structures, financing mechanisms and delivery systems, with particular attention to program formation. (Same as MPAD 6172). *(Fall or Spring) (Evenings or Weekends)*

HADM 6104. Health and Disease. (3) Principles and methods of epidemiology including definitions and models of health, illness, and disease; modes of transmission of clinically important infectious agents; risk factors and chronic diseases; and insights into existing studies and paradigms of health promotion and disease prevention. *(Fall or Spring) (Evenings or Weekends)*

HADM 6108. Decision Analysis in Health Care. (3) The study of selected quantitative management tools useful in the analysis of managerial decisions. Includes a review of basic descriptive and inferential statistics, applied probability distributions, forecasting methods, statistical process control, queuing, transportation and assignment modeling, and linear programming. The emphasis is on applying quantitative decision making methods to the operational problems facing health care organizations. Familiarity with computers and computer software will be important for success in this course. *(Fall or Spring) (Evenings or Weekends)*

HADM 6116. Accounting for Health Care Management. (3) Basic concepts and techniques of collecting, processing and reporting financial information relevant to health care institutions. Emphasizes a conceptual understanding of financial accounting, technical tools of cost accounting, including budget preparation and analysis, and interpretation of financial statements. *(Fall or Spring) (Evenings or Weekends)*

HADM 6120. Health Economics. (3) Examination of the economic context of health services delivery and policies, and application of economic concepts to the health care sector including supply and demand, elasticity, regulation, competition and cost effectiveness analysis. *(Fall or Spring) (Evenings or Weekends)*

HADM 6124. Marketing in Health Care. (3) Provides an in-depth understanding of the essential concepts of marketing and their application to health care. Students gain a working knowledge of marketing tools and how to use them in the context of health care. Students build practical applied skills in analyzing health care marketing problems and developing health care marketing programs and strategies. Students also expand their understanding of the differences and similarities between health services and social marketing. *(Fall or Spring) (Evenings or Weekends)*

HADM 6128. Human Resources Management. (3) Examines human resources management as it applies to health services institutions, including compensation benefits, personnel planning, recruitment, selection, training and development, employee appraisal and discipline, union-management relations and quality management. *(Fall or Spring) (Evenings or Weekends)*

HADM 6134. Quality and Outcomes Management in Health Care. (3) Examination of the concepts and practices of quality management, performance improvement, and assessment of outcomes in health care delivery settings. Designed to provide an in-depth understanding of basic concepts and frameworks and of their applicability and relevance in specific situations. Examples of topics to be covered include: process reengineering, service improvement, continuous quality improvement, accreditation standards, patient satisfaction, outcome measurement, teamwork, and case management. *(Fall or Spring) (Evenings or Weekends)*

HADM 6138. Health Care Finance. (3) Prerequisite: HADM 6116. Fundamental financial management concepts and tools for health care institutions, including financial statements and attributes, capital acquisition and allocation, investment analysis, capital and cash flow management and contractual relationships. *(Fall or Spring) (Evenings or Weekends)*

HADM 6142. Health Policy Development. (3) Prerequisite: HADM 6100/MPAD 6172. Examination of the formulation, adoption and implementation of public policy for health services delivery and health care through federal, state, and local political processes. (Same as MPAD 6174) *(Fall or Spring) (Evenings or Weekends)*

HADM 6145. Organization Behavior in Health Care. (3) Introduction to organizational theory with applications to health care systems, including organizational design and inter-organizational networks/alliances. Examination of communication and leadership skills development, including conflict, labor and dispute management. *(Fall or Spring) (Evenings or Weekends)*

HADM 6146. Information Resources Management. (3) A study of the use of information management to improve the delivery of health care. Information resource management includes methods and practices to acquire, disseminate, store, interpret and use information to provide health care in a more efficient, effective and economical manner. Emphasis is placed upon information as central to the ongoing operations and strategic decisions of health care organizations. (Same as NURS 6162). *(Fall or Spring) (Evenings or Weekends)*

HADM 6150. Health Law and Ethics. (3) Analysis of ethical and bioethical problems confronting health care delivery systems. Selected legal principles and their application to the health care field, including corporate liability, malpractice, informed consent and governmental regulation of health personnel and health facilities. *(Fall or Spring) (Evenings or Weekends)*

HADM 6154. Strategic Management of Health Services Organizations. (3) Prerequisites: All core courses except HADM 6146 and HADM 6150. Analysis of strategic planning, managing and marketing concepts, techniques and tools within the health care industry, including organizational capability analysis and business plan development. *(Fall or Spring) (Evenings or Weekends)*

HADM 6200. Health Insurance and Managed Care. (3) Fundamentals of managed health care systems, including risk arrangements, compensation, incentives, quality assurance, financing and public programs. *(On Demand)*

HADM 6204. Trends and Issues in Health Administration. (3) Examination of current issues confronting health care managers and an assessment of programs and management responses to emerging trends in the health care filed, including delivery systems, marketing/competition, financing and/or epidemiological changes. Same as MPAD 6176. *(On Demand)*

HADM 6208. Research Methods for Health Care Administration. (3) Prerequisite: undergraduate statistics course. Study of selected statistical techniques useful in the analysis of managerial decisions and interpretation and evaluation of research. Introduction to systems analysis and selected operations research techniques as applied to problem solving and decision making in health care institutions. *(Fall or Spring) (Evenings or Weekends)*

HADM 6212. Health, Aging and Long Term Care. (3) This course offers an overview of the health status of an aging U.S. population, with a focus on long-term care. Topics include: demographics of an aging society, health status of older people, societal values related to aging and long-term care, informal care giving, the formal service provision system, relevant public policies, and challenges for the future. *(Fall or Spring) (Evenings or Weekends)*

HADM 6216. Long Term Care Administration. (3) This course provides an overview of the long-term care system, with an emphasis on older persons. Class content includes the exploration of issues surrounding the provision of long-term care, identification of the various components of the long-term care system, and discussion of the role of health administration within the long-term care system. *(Fall or Spring) (Evenings or Weekends)*

HADM 6400. Internship. (3) Prerequisite: Completed HADM 6100 and 15 additional hours of core course requirements. The purpose of the health administration internship is to offer administrative experience in a healthcare setting for students. The initial assumption is made that students participating in the internship experience have had limited hands-on exposure to healthcare administration. *(Fall, Spring, Summer)*

HADM 6800. Independent Study. (1-3) Guided individual study in an issue related to health administration arranged with a faculty member or supervised experience in an administrative setting in a program or entity within the health care delivery system. (Pass/Fail) *(On demand)*

HADM 6999. Thesis. (3) Production of independent research relevant to health administration which demonstrates contribution to professional knowledge through systemic investigation. Pass/In Progress grading. *(Fall, Spring, Summer)*

HADM 7999. Graduate Residence. (1) Prerequisite 6999. Continuation of thesis on a topic of significance in health administration. *(Fall, Spring, Summer)*

HEALTH PROMOTION

Department of Health Behavior and Administration

Bernhard 225
704-687-2957
http://www.health.uncc.edu/dept/HBA

Degree

M.S., Graduate Certificate

Coordinator

Michael Thompson, Assistant Professor

Graduate Faculty

Linda Berne, Professor Emeritus
Larissa Brunner, Assistant Professor
Robert Buchanan, Professor
Jessica Hartos, Assistant Professor
Andrew Harver, Professor
William J. McAuley, Professor
Lutchmie Narine, Associate Professor
Gerald Pyle, Professor Emeritus
Michael Thompson, Assistant Professor
Jennifer Troyer, Assistant Professor
Jan Warren-Findlow, Assistant Pforessor

Adjunct Faculty

John E. Barkley, Adjunct Assistant Professor
Deborah S. Bosley, Adjunct Associate Professor
William Brandon, Adjunct Professor
Jacek Dmochowski, Adjunct Associate Professor
Ruth L. Greene, Adjunct Professor
Sonya R. Hardin, Associate Professor
Rosemarie Tong, Adjunct Professor

MASTER OF SCIENCE IN HEALTH PROMOTION

The Master of Science in Health Promotion enables students to become health promotion specialists by fulfilling the basic requirements of the MS along with specialty courses to match students' interests. The series of core courses and selection of a specialty (clinical exercise physiology or community health promotion)

provide experiences useful for employment in a variety of settings such as health related agencies and organizations, hospitals, health departments, worksite wellness programs, fitness centers, and insurance companies.

Additional Admissions Requirements

1) Acceptable scores on the Miller Analogies Test or GRE.
2) Undergraduate GPA that demonstrates potential for successful graduate work
3) Undergraduate statistics course and a health-related course are required for all students.

Degree Requirements

The program requires a minimum of 42 semester hours of graduate credit including 18 hours of core courses, 9 hours from a chosen concentration (either practitioner or researcher), and 15 hours in a content specialty area.

Assistantships

Positions as a research assistant or teaching assistant may be available. Grant funded assistantships may be available as well. Students seeking assistantships should contact the Office Assistant assigned for the Department of Health Behavior and Administration.

Internships

Students needing field experiences may elect an internship course which provides 100 or more hours in a field placement.

Core Courses

HLTH6189 Epidemiology (3)
HLTH6120 Philosophy and Practice of Health Promotion (3)
HLTH6141 Health Promotion Administration (3)
HLTH6143 Behavior Change in Health Promotion (3)
HLTH6222 Health Promotion Analysis (3)
NURS6160 Research Methods in Nursing and Health Professions (3)

Concentrations (9 hours) (Select ONE concentration)

Practitioner Concentration

HLTH6145 Health Promotion Planning and Evaluation (3 credits)
HLTH6250 Methods of Health Promotion and Education (3 credits)
HLTH6886 Health Promotion Project (3 credits)

Research Concentration

HLTH6223 Advance Data Analysis in Health Promotion (3 credits)
HLTH6224 Health Promotion Measurement (3 credits)
HLTH6900 Research and Thesis in Health Promotion (3 credits)

Specialty Area Descriptions

Specialty Areas (15 hours) (Select ONE specialty area)

Community Health Promotion

HLTH6160 Community Health (3 hours)
HLTH5128 Environmental Health (3 hours)
HLTH5126 Adolescent Sexuality (3 hours)
HLTH5122 Drugs and Society (3 hours)
HLTH6279 International Health (3 hours)

Capstone Experiences

Near the completion of the program of study, each student is required to select either a health promotion project or research thesis that demonstrates a contribution to professional practice or knowledge through systematic evaluation or investigation. The student is responsible for organizing a committee of three faculty members (and an outside community person if appropriate) to supervise, monitor and evaluate the project or thesis.

Advising

Upon acceptance into the program, an academic advisor is assigned to each student. Students are expected to meet with their advisors on a regular basis to plan their progression through their program of study. Any course substitution must be approved by the academic advisor.

Research Opportunities/Experiences

A range of research opportunities exist in the Department of Health Behavior and Administration and in the Department of Kinesiology for qualified students.

Tuition Waivers

Tuition waivers are available with some grant-funded assistantships.

Financial Aid/Financial Assistance

A wide range of opportunities for financial aid/assistance is available to qualifying students, which may be accessed through the financial aid office. See the financial information section of this graduate catalog for more information on the opportunities that are available, and how to contact the financial aid office.

Program Certifications/Accreditations

Completion of the clinical exercise physiology specialty qualifies the graduate to take the Clinical Exercise Physiology Registry Examination (RCEP) administered by the American College of Sports Medicine.

Upon completion of the degree in health promotion, graduates are eligible to sit for the Certified Health Education Specialist (CHES) national certification examination administered by the National Commission for Health Education Credentialing.

GRADUATE CERTIFICATE IN COMMUNITY HEALTH PROMOTION

The Graduate Certificate Program in Community Health Promotion contributes to the preparation of a range of community and public health practitioners to plan for the Certified Health Education Specialist (CHES) national exam. It also serves to increase the skills and knowledge of public health practitioners in selected content areas and in emerging global health issues. Completion of this certificate does not provide admission to the M.S. program.

Admission Requirements

Students are admitted to the Graduate School in a special category for certificate programs. See general information on admission to graduate certificate programs elsewhere in this Catalog.

Certificate Requirements

The Graduate Certificate in Community Health Promotion requires 15 hours in the following approved courses: HLTH 5122 (Drugs and Society), HLTH 5126 (Adolescent Sexuality and Family Life Education), HLTH 5128 (Environmental Health: A Global Perspective), HLTH 6160 (Community Health), and HLTH 6279 (International Health).

Transfer Credit

Transfer credits are not accepted in the Certificate program.

Courses in Health Promotion

HLTH 5120. Mental and Emotional Well-being. (3) Examines mental and emotional health from the perspective of the health educator's role as facilitator of mental and emotional wellness *(2 year cycle)*

HLTH 5122. Drugs and Society. (3) Teaching methodology, knowledge and skills for affecting appropriate behaviors through the study of use, misuse and abuse of natural and synthetic chemicals in today's society *(On demand)*

HLTH 5124. Safety Through the Life Span. (3) Prerequisite: Consent of the department. Introduction to accident/injury prevention emphasizing personal responsibility for health care with a focus on psycho-social development and a wellness approach to safety management *(On demand)*

HLTH 5126. Adolescent Sexuality and Family Life Education. (3) Designed for teachers, counselors, school nurses, administrators and others responsible for family life education programs in school, with focus on adolescent sexuality issues. *(2 year cycle Summer)*

HLTH 5128. Environmental Health: A Global Perspective. (3) Teaching methodology, knowledge and skills for affecting appropriate health behaviors through study of the causes and effects of contemporary environmental problems. *(On demand)*

HLTH 5130. Applied Nutrition for Today's Consumer. (3) Principles of nutrition, dietary guidelines, dietary relationships to diseases and health, special populations, computerized dietary analysis. *(2 year cycle) (Same as KNES 5130)*

HLTH 5136. Health Product and Service Consumerism. (3) Teaching methodology, knowledge and skills for affecting appropriate health behaviors through emphasis on the individual consumer at the health marketplace. *(On demand)*

HLTH 5299. Epidemiology. (3) Prerequisite: permission of the instructor. Traditional aspects of epidemiology, including practical disease concepts, epidemiological measures of health status, mortality and morbidity rates and ratios, descriptive statistics, research design, cohort studies, case-control studies, and prospective and retrospective analysis. *(Fall)*

HLTH 6120. Philosophy and Practice in Health Promotion. (3) Philosophies, modalities and arenas of practice in health promotion; role delineation, professional development, advocacy and ethics. *(Fall)*

HLTH 6141. Health Promotion Administration. (3) Management and leadership, strategic planning, grant proposal. *(On demand)*

HLTH 6143. Behavior Change in Health Promotion. (3) Assessment and modification of health behaviors. *(Spring)*

HLTH 6145. Health Promotion Planning and Evaluation. (3) Designing, implementing and evaluating health promotion/education programs within work site, school and community settings. *(Fall)*

HLTH 6151. Coordinating the School Health Education Program. (3) Examines the school health education program from the perspective of the school health education coordinator. *(On demand)*

HLTH 6153. Worksite Health Promotion. (3) Prerequisite: consent of the instructor. An exploration of the practices of promoting health in various settings for a variety of consumers. *(Yearly)*

HLTH 6155. Health Risk Reduction and Disease Prevention. (3) Personal/professional management of

risk factors and lifestyle intervention processes for leading causes of mortality and morbidity. *(On demand)*

HLTH 6160. Community Health. (3) The nature and delineation of communities as social systems; principles and practices relevant to community health. *(Yearly)*

HLTH 6189. Community Epidemiology. (3) Principles and methods of epidemiology including definitions and models of health, illness and disease; modes of transmission of clinically important infectious agents; risk factors and chronic diseases; and insights into existing studies and paradigms of health promotion and disease prevention. *(Same as HADM 6103) (Spring)*

HLTH 6222. Health Promotion Analysis. (3) The purpose of this course is to teach students data analysis techniques used in the health professions. Students will understand data in terms of proper analysis techniques, perform various types of data analyses using various software applications, interpret results, and communicate results orally and in writing. *(Spring)*

HLTH 6223. Advanced Data Analysis in Health Promotion. (3) Prerequisite: HLTH 6222. The purpose of this course is to educate students on advanced statistical and data analysis techniques used in health professions. Additionally, this course is designed to increase students' ability to use health related computer software. *(Every 2 years)*

HLTH 6224. Health Promotion Measurement. (3) Prerequisite: HLTH 6222: The purpose of this course is to educate students on applied measurement techniques used in the health sciences. The skills obtained from this course will be useful in health related program evaluations, testing of models of health theories, development of health surveys, health needs assessments. It includes an exploration of methods of establishing reliability and validity estimates as modeled by Classical Test Theory, Item Response Theory, and through the use of Structural Equation Modeling with Health Theories. *(Every 2 years)*

HLTH 6250. Methods in Health Promotion and Education. (3) Core requisite: HLTH 6120, HLTH 6143, or permission of instructor. Instructional pedagogy and health promotion methods based on the ecological model of health including strategies directed at policy, community, institutional, inter-and intra-personal levels. *(Fall)*

HLTH 6279. International Health. (3) Principles and methods of studying international health, including historical background, sources and problems associated with health data, the social context, the role of government and non- government agencies, health in relation to environment and development, international health projects, defining the international health sector, infectious disease problems, and the practice of international health. *(Every 2 years)*

HLTH 6471. Seminar and Internship in Health Education. (1-6) Prerequisites: Completion of 12 or more graduate credit hours in health education and permission of the health promotion program coordinator. Supervised practice in health education. May be repeated for a different seminar and internship. Offered only on a Pass/No Credit basis. *(Fall, Spring, Summer)*

HLTH 6886. Health Promotion Project. (3) Prerequisite: completion of 36 hours toward the Health Promotion Master of Science Degree. A capstone synthesis course in which candidate applies needs assessments, program planning, implementing, and evaluation skills to a problem or an opportunity in a community health promotion setting with a target population. *(Every semester) (Same as KNES 6886)*

HLTH 6899. Problems and Topics in Health. (1-6) Topics and special problems related to issues, practices or sufficient trends in health promotion. Institutes, workshops, seminars and independent studies. *(Fall, Spring, Summer)*

HLTH 6900. Research and Thesis in Health Promotion. (3) Prerequisite: Satisfactory completion of NURS 6160; completion of at least 24 hours of graduate program; consent of instructor overseeing thesis research. Design, implementation, presentation, and evaluation of an approved research project in student's specialty area. The applied project is of the student's own design under the supervision of an advisor and graduate committee. Graded Pass/No Credit only. *(Every semester) (Same as KNES 6900)*

HLTH 7999. Masters Degree Graduate Residence. (1) *(Fall, Spring, Summer)*

NURSING

The CCNE accredited Master of Science in Nursing degree is designed to prepare nurses for advanced practice in a specialized area of nursing as a clinical nurse specialist, nurse practitioner or nurse administrator. Six specialty concentrations are available and include: Adult Health CNS/ANP; Community Health Nursing; Family Nurse Practitioner; Psychiatric/Mental Health Nursing; Nurse Anesthesia; and the MSN/MHA. Additionally there are options in School Nursing in both the Family Nurse Practitioner and Community Health concentrations. A post-master's certificate in Nursing Education is available as well. Please visit our website at http://www.health.uncc.edu

SCHOOL OF NURSING

Associate Dean and Director, School of Nursing

Pamala D. Larsen
2038 Colvard Building
704-687-6130

Department of Adult Health Nursing

Jacqueline Dienemann, Chair
2046 Colvard Building
704-687-4652

Department of Family and Community Nursing

William K. Cody, Chair
2038 Colvard Building
704-687-4683

Specialty Concentration Coordinators:

Adult Health CNS/ANP
Linda Steele, Associate Professor

Community Health Nursing
Gwendolyn Foss, Associate Professor

Family Nurse Practitioner
Carolyn Maynard, Assistant Professor

Psychiatric/Mental Health
Ann Newman, Associate Professor

Nurse Anesthesia
Linda Moore, Associate Professor

MSN/MHA
Sonya Hardin, Associate Professor

Nursing Education Certificate
Ann Newman, Associate Professor

Program Name

Master of Science in Nursing

Degree

MSN, MSN/MHA, Certificates

Additional Admission and Progression Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Nursing*:

1) Current unrestricted licensure as a Registered Nurse. Current licensure to practice nursing in North Carolina or the state identified by faculty for clinical practice is required for progression into clinical courses.
2) Baccalaureate degree from a nationally accredited nursing program.
3) Satisfactory performance on the aptitude portion of the Graduate Record Exam or the Miller Analogies Test.
4) One year of professional nursing practice following completion of the baccalaureate degree is recommended.
5) Overall GPA of at least 3.0 on the last 60 semester hours attempted.
6) Completion of a statistics course with a grade of C or better.
7) The application for admission and all supporting credentials must be received in the Office of Graduate Admissions no later than **November 15** for spring admission, **March 15** for summer admission and **July 1** for fall admission.

*See additional requirements for specific specialty concentration

Early Entry Program for the Master of Science in Nursing

The RN-MSN program is designed for the outstanding student who wants to pursue an accelerated path to the MSN. Students must first be admitted to the RN-BSN program, and within the first semester of that program make application to the Graduate Program. Students must obtain satisfactory scores on GREs or the Miller Analogy Test as do other nursing graduate students, have an overall GPA of at least 3.2, at least 75 hours completed, and the usual letters of recommendation. Students must also have at least one year nursing practice if they have a B.S. or B.A. in another field or two years nursing practice if they come from a diploma or associate degree program. In addition, they must have at least 9 hours of work at a senior university. Students can be admitted to any of the following concentrations: Community Health, Family Nurse Practitioner, MSN/MHA, Adult Health CNS/ANP or Psych/Mental Health Nursing. A student may not be admitted into the program until completion of at least 90 undergraduate hours. The nurse anesthesia specialty concentration does not have an early entry option.

Admission is provisional based upon evidence of successful completion of the BSN and maintenance of a GPA of at least 3.0 on the last 60 hours of nursing courses. Upon conditional admission to the MSN program (during the 1st semester of the BSN program), twelve (12) graduate credit hours will be substituted for twelve (12) required undergraduate hours. Of the 12 undergraduate hours, NURS 4090 and NURN 4251 will be replaced by NURS 6115 and NURS 6101. The other six (6) hours of undergraduate courses that are substituted vary within each of the 5 specialty concentrations. Both NURS 6115 and NURS 6101 are graduate courses required of all students in the MSN program regardless of the clinical specialty concentration.

Degree Requirements

The MSN specialty concentrations require completion of 43 to 63 graduate credit hours depending on the specialty. Specific requirements and prerequisites for each program are listed below. Most programs are designed to accommodate full-time and part-time students, and many classes are held in the late afternoon or evening to serve students who are employed.

Graduate transfer credit may be accepted from another accredited institution for up to six semester hours upon approval of the student's advisor, the department chair and the Dean of the Graduate School. All course work, including accepted transfer credits, must be completed within a six-year period.

Assistantships

A limited number of graduate assistantships are available. Information about them is available in each Department, the School of Nursing, and the Associate Dean for Academic Affairs, College of Health and Human Services.

Additional Financial Aid

Scholarships from the North Carolina Nurse Scholars Program – Master's Program (M-NSP) are available to part-time or full-time students admitted to the nursing program for up to two years of study. The M-NSP scholarships are competitive and preference will be given to full-time students. Awards are not based on financial need. The application deadline is early May. Further information and application forms are available in the Office of Student Services in the College of Health and Human Services.

A limited number of Professional Nurse Traineeships are available to full-time students. The traineeship awards fund a portion of in-state tuition/fees. Further information and application forms are available from the School of Nursing. Students in the nurse anesthesia concentration are eligible for Nurse Anesthesia Traineeships. Information for those awards is available from the Nurse Anesthesia Program Coordinator.

ADULT HEALTH NURSING

Degree

M.S.N., Post-Master's Certificate

Coordinator

Linda Steele, Associate Professor

Graduate Faculty

Mary Curran, Associate Professor
Jacqueline Dienemann, Professor
Sonya Hardin, Associate Professor
Sabrina Kao, Assistant Professor
Pamala Larsen, Professor
Linda Moore, Associate Professor
L. Deloris Sanders, Assistant Professor
Linda Steele, Associate Professor
Margaret Wilmoth, Professor

Advanced Practice Registered Nursing in Adult Health (ANP/CNS)

The program will lead to a Master of Science in Nursing degree, with a concentration in Adult Health Nursing. These advanced practice registered nurses (APRN) will be prepared to function as clinical nurse specialists (CNS) and/or adult nurse practitioners (ANP) in a blended role in diverse settings. The graduates of the program will be APRNs with expertise in adult health who possess advanced clinical diagnostic and reasoning skills to manage and prescribe health care for adults with acute and chronic illness, identify high risk behaviors that have the potential to lead to illness, provide health promotion and disease prevention instruction and collaborate with patients and their families to manage care. The graduate will be eligible to take national certification examinations for Adult Nurse Practitioner and the Medical-Surgical or Gerontological ANCC examination as a Clinical Nurse Specialist.

Degree Requirements

The program requires completion of 47 semester credit hours in approved courses including:

Core Courses (9 credit hours)

NURS6101	Theoretical Basis for Nursing Practice (3)
NURS6160	Research in Nursing and the Health Professions (3)
NURS6115	Health Policy and Planning in the U.S. (3)

Cognate Courses (6 credit hours)

BIOL6050	Special Topics in Physiology (Pathophysiology) (3)
STAT6027	Topics in Statistics (3)

Advanced Practice Specialty (8 credit hours)

NURS6230	Advanced Health Assessment and Diagnostic Reasoning (2)
*NURS6430	Advanced Health Assessment Practicum (1)
NURS6220	Pharmacotherapeutics in Advanced Nursing Practice (3)
NURS6105	Roles and Issues in Advanced Practice Registered Nursing (2)

Specialty Concentration (24 credit hours)

NUCI6100	Chronic Illness: Concepts and Theories for Advanced Nursing Practice (3)
*NUCI6403	Advanced Practice Nursing in Chronic Care (4)
NUCI6106	Health Care Management of Adults I (3)
*NUCI6401	Advanced Practice Nursing in Ambulatory Care (4)
NUCI6107	Health Care Management of Adults II (2)
NUCI6108	Health Care Management of Women (1)
*NUCI6402	Advanced Practice Nursing in Acute Care (4)
NUCI6601	Synthesis in Advanced Practice Nursing I(1)
NUCI6602	Synthesis in Advanced Practice Nursing II(2)

* Clinical Courses with 60 hours practice for each 1 credit hour.

Post-Master's Certificate In Advanced Practice Registered Nursing (ANP/CNS)

The post masters certificate program in Advanced Practice Registered Nursing consists of specialty courses in advanced practice nursing (21 graduate credit hours). This certificate program will prepare nurses holding masters degrees in nursing to enter advanced practice nursing as an adult nurse practitioner and/or a clinical nurse specialist (a blended role) with a specialty in chronic illness care and skills to function in diverse settings. The recipients of this certificate would be eligible to take the American Nurses Credentialing Center (ANCC) examination for Adult Nurse Practitioners and the Medical-Surgical or Gerontological ANCC examination as a Clinical Nurse Specialist. Course work must be completed within four years and a 3.0 (B) grade point average is required. Students will complete 4 specialty core courses and 3 clinical courses. This program can be completed in one year of full time study or two years part time study.

Admission Requirements:

1) A masters degree in nursing from a nationally accredited nursing program
2) Satisfactory GRE or MAT scores
3) Written application to graduate admissions
4) Unencumbered North Carolina License as a Registered Nurse
5) Official transcripts
6) Graduate Health Assessment course equivalent within the last 3 years
7) Graduate Pharmacology course equivalent within the last 3 years
8) Graduate Pathophysiology within the last 3 years

Certificate Requirements:

NUCI6100	Chronic Illness: Concepts and Theories for Advance Nursing Practice (3)
NUCI6106	Health Care Management of Adults I (3)
NUCI6107	Health Care Management of Adults II (3)
NUCI6108	Health Care Management of Women (1)
NUCI6401	Advanced Practice Nursing in Ambulatory Care (4)
NUCI6402	Advanced Practice Nursing in Acute Care (4)
NUCI6403	Advanced Practice Nursing in Chronic Care (4)

NURSING - AND HEALTH ADMINISTRATION

Department of Adult Health Nursing

Colvard 2046
704-687-4652
http://www.health.uncc.edu

Degree

M.S.N./M.H.A., Post-Master's Certificate

Coordinator

Sonya Hardin, Associate Professor

Graduate Faculty

Nursing

Mary Curran, Associate Professor
Jacqueline Dienemann, Professor
Sonya Hardin, Associate Professor
Sabrina Kao, Assistant Professor
Pamala Larsen, Professor
Linda Moore, Associate Professor
L. Delores Sanders, Assistant Professor
Linda Steele, Associate Professor
Margaret Wilmoth, Professor

Health Administration
William Brandon, Professor
Sonya Hardin, Associate Professor
Lutchmie Narine, Associate Professor
Gerald Pyle, Professor Emeritus
Rosemarie Tong, Professor
Jennifer Troyer, Assistant Professor

M.S.N./M.H.A. Program

The Master of Science in Nursing and Master of Health Administration program is an interdisciplinary dual degree program designed to prepare nurse leaders in healthcare. This program enables baccalaureate prepared nurses to pursue a degree option which combines the areas of nursing and health care administration. Applicants musts be admitted to and satisfy requirements for both programs.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in the MSN/MHA program:

1) BSN degree from a nationally or international program with an overall GPA of at least 3.0 (on a 4.0 scale) on all previous work beyond high school.
2) Current unencumbered licensure as a Registered Nurse in North Carolina or nursing certificate from country of origin.
3) Satisfactory performance on the Graduate Record Exam (GRE), or the Graduate Management Admission Test (GMAT). (Not required for applicants who hold another graduate degree; e.g. M.B.A., M.S.W., M.D.)
4) Prerequisite course in introductory statistics with a grade of C or better.
5) Essay describing the applicant's experience and objective in undertaking graduate study.
6) Basic computer skills including the use of word processing, spread sheet and data base software.

Degree Requirements

The MSN/MHA degree requires 51 credit hours of courses offered through the College of Nursing and Health Professions. Additionally each student will complete a 144-hour practicum experience in nursing administration:

Required Courses for Nursing and Health Administration (27 hours)

STAT6027 Topics in Statistics (3)
NURS6101 Theoretical Basis for Nursing Practice (3)
NURS6160 Research in Nursing and the Health Professions (3)
NURS6162/ Information Resource Management (3)
or
HADM6146 Information Resource Management (3)
NUNA6175 Theory & Application of Admin to Nursing Systems (3)
NUNA6490 Advanced Practicum in Nursing Administration (3)
HADM6104 Health and Disease
NURS6115 Health Policy and Planning in the U.S. (3)
or
HADM6100 Introduction to the U.S. Health Care System (3)
Guided Nursing Elective (3)

Required Courses for Health Administration (24 hours)

HADM6120 Health Economics (3)
HADM6116 Accounting for Health Care Management (3)
HADM138 Finance in Health Care Administration (3)
HADM6150 Health Law and Ethics (3)
HADM6145 Organization Behavior in Health Care (3)
HADM6128 Human Resource Management (3)
HADM6154 Strategic Management of Health Services Organizations (3)
Guided Elective (3)

Assistantships

Graduate Assistantships available for master's degree students are limited in number. For information on graduate assistantships and other financial aid, please contact the Office of Student Services, College of Health and Human Services, UNC Charlotte, 9201 University City Blvd. Charlotte, NC 28223-0001, (704) 687-4690

Practicum/Capstone Experience

NUNA6490 Advanced Practicum in Nursing Administration (3)

Advising

Faculty advising is required each semester.

Licensure

Current unencumbered licensure as a registered nurse in North Carolina

Research Opportunities/Experiences

Students who choose to do so will have the opportunity to serve as Research Assistants on faculty research projects.

Financial Assistance

For information on financial aid, please contact the Office of Student Services, College of Health and Human Services, UNC Charlotte, 9201 University City Blvd. Charlotte, NC 28223-0001, (704) 687-4690.

Program Certifications/Accreditations

The MSN Program is accredited by CCNE. Graduates of the program will be eligible to take the American Nurses

Credentialing Center (ANCC) examination for Nurse Administration, Advanced.

Post Master's Certificate In Nursing Administration

The Post-Masters Certificate in Nursing Administration is designed for nurses who hold a master's degree but want to enhance their administrative skills. Often advanced practice nurses need additional knowledge to be competitive in managing personnel or groups.

The Nursing Administration Certificate program of study consists of specialty courses in nursing administration and health administration (15 graduate credit hours). Course work must be completed within four years and a 3.0 ("B") grade point average is required. Students will complete four core courses and choose one three-credit-hour elective. The certificate can be completed in 1 1/2 to 2 years through part-time study.

Admission Requirements

In addition to the general requirements of the Graduate School, admission to this graduate certificate program also requires the following:

1) Master's degree in nursing from an accredited university
2) GPA of 3.0 required from previous degree
3) Current unrestricted North Carolina licensure as a Registered Nurse

Graduation Requirements

1) Completion of 15 hours of required coursework within four years.
2) Students must maintain a minimum 3.0 ("B") GPA in their graduate courses, and may not accumulate more than two "C" grades.

Certificate Requirements

NUNA6175 Theory and Application of Administration to Nursing Systems (3)
NUNA6490 Advanced Practicum in Nursing Administration (3)
HADM6145 Organization Behavior in HealthCare (3)
HADM6123 Accounting in Health Administration (3)
One elective in Nursing or Health Administration (3)
Total credit = 15 hours

For Additional Information Contact

Office of Student Services
College of Health and Human Services
UNC Charlotte
9201 University City Blvd.
Charlotte, NC 28223-0001

Colvard 2009
704 687 4690 (Phone)
704 687 3180 (Fax)
shmann@email.uncc.edu

NURSE ANESTHESIA

Department of Adult Health Nursing

Colvard 2046
704-687-4652

Degree

M.S.N., Post-Master's Certificate

Coordinator

Dr. Linda Moore, Associate Professor

M.S.N. : Nurse Anesthesia

The specialty concentration in Nurse Anesthesia is offered in conjunction with the Carolinas Health Care System and is accredited by the Council on Accreditation of Nurse Anesthesia Education Programs. It provides both the theory and clinical practice required to qualify to take the national certifying examination upon graduation. In addition to MSN core courses, students complete cognate and clinical courses in nurse anesthesia as well as clinical experiences at Carolinas HealthCare System and other affiliated sites.

Additional Admission Requirements

In addition to the requirements of the Graduate School and College, applicants to the Nurse Anesthesia program must have:

1) an overall 3.0 in all undergraduate work;
2) 2 years of current critical care experience with adult clients by the time of admission into the program;
3) certification in Advanced Cardiac Life Support (ACLS), Basic Cardiac Life Support (BCLS) Pediatric Advanced Life Support (PALS); and
4) satisfactory GRE scores (MAT scores are not accepted).

Applicants who meet the admission requirements will be eligible to be invited for an interview with the Admissions Committee, which are held in January, April and September/October. The application process requires two applications – one to UNC Charlotte and one to Carolinas HealthCare System. Only after a successful interview, will the applicant be admitted.

Degree Requirements

The program requires completion of 63 semester hours in approved courses including:

Core Courses (15 hours)

NURS6101 Theoretical Basis for Nursing Practice (3)
NURS6115 Health Policy and Planning in the U.S. (3)
NURS6160 Research in Nursing and the Health Professions (3)

STAT6027 Topics In Statistics (3)
BIOL6050 Advanced Human Physiology (3)

Clinical Concentration (48 hours)
NUAN6151 Principles of Nurse Anesthesia I (3)
NUAN6152 Principles of Nurse Anesthesia II (3)
NUAN6153 Principles of Nurse Anesthesia III (3)
NUAN6154 Pharmacology of Non Anesthetic Agents (4)
NUAN6155 Pharmacology of Anesthetic Agents (4)
NUAN6156 Applied Physics and Chemistry in Nurse Anesthesia (3)
NUAN6157 Applied Pathophysiology in Nurse Anesthesia I (3)
NUAN6158 Applied Pathophysiology in Nurse Anesthesia II (3)
NUAN6159 Professional Aspects of Nurse Anesthesia (2)
NUAN6485 Clinical Residency in Nurse Anesthesia I (5)
NUAN6486 Clinical Residency in Nurse Anesthesia II (5)
NUAN6487 Clinical Residency in Nurse Anesthesia III (5)
NUAN6489 Clinical Residency in Nurse Anesthesia IV (5)

Post-Master's Certificate in Nurse Anesthesia

The post-graduate certificate will be awarded to students who have completed a Master of Science in Nursing (MSN) from an accredited program and wish to function as a Certified Registered Nurse Anesthetist (CRNA).

Additional Admission Requirements

In addition to the requirements of the Graduate School and College, applicants to the Nurse Anesthesia program must have:

1) 2 years of current critical care experience with adult clients by the time the student is admitted to the program;
2) Certification in Advanced Cardiac Life Support (ACLS), Basic Cardiac Life Support (BCLS) Pediatric Advanced Life Support (PALS), (4) satisfactory GRE scores (MAT scores are not accepted);.
3) A Graduate level Physiology course (equivalent to BIOL 6050) within the last 3 years; and
4) Personal statement outlining why the applicant seeks admission to graduate certificate program

Applicants who meet the admission requirements will be eligible to be invited for an interview with the Admissions Committee. Only after a successful interview, will the applicant be admitted.

Certificate Requirements

The full-time course of study plan allow for certificate completion within 27 months of full time study or 39 months of part time study. Interviews are conducted three times per year, in January, April, and September/October. All application materials must be submitted to the Graduate School and the Nurse Anesthesia program no later than eight weeks prior to the interviews. Courses must be taken in the order outlined in the master's curriculum. In addition the student must complete all requirements outlined by the Council on Certification of Nurse Anesthetists (CCNA)

Clinical Concentration (48 hours)
NUAN6151 Principles of Anesthesia I (3)
NUAN6152 Principles of Anesthesia II (3)
NUAN6153 Principles of Anesthesia III (3)
NUAN6154 Pharmacology of Non Anesthetic Agents (4)
NUAN6155 Pharmacology of Anesthetic Agents (4)
NUAN6156 Applied Physics and Chemistry in Nurse Anesthesia (3)
NUAN6157 Applied Pathophysiology in Nurse Anesthesia I (3)
NUAN6158 Applied Pathophysiology in Nurse Anesthesia II (3)
NUAN6159 Professional Aspects of Nurse Anesthesia (2)
NUAN6485 Clinical Residency in Nurse Anesthesia I (5)
NUAN6486 Clinical Residency in Nurse Anesthesia II (5)
NUAN6487 Clinical Residency in Nurse Anesthesia III (5)
NUAN6489 Clinical Residency in Nurse Anesthesia IV (5)

Process

The application process requires two applications – one to UNC Charlotte and one to Carolinas HealthCare System.

1) UNC Charlotte application forms and materials can be obtained from:
Graduate Admissions
UNC Charlotte
210 Cato Hall
9201 University City Blvd.
Charlotte, NC 28223-0001
704.687.3366 (phone)
704.687.3279 (fax)
http://www.uncc.edu/gradmiss

2) The Carolinas HealthCare System application forms and materials can be obtained from "
Carolinas HealthCare System
Nurse Anesthesia Program
P.O. Box 32861
Charlotte, NC 28232-2861
704.355.2375 (Phone)
704.355.7263 (Fax)
http://www.carolinas.org/Education/nurseanesthesi
a

FAMILY NURSE PRACTITIONER (FNP)

Department of Family and Community Nursing

Colvard 2038
704-687-4683
http://www.health.uncc.edu/FCN

Degree

MSN, Post-Master's Certificate

Coordinator

Carolyn Maynard, Assistant Professor

Graduate Faculty

Mary Curran, Associate Professor
Lienne Edwards, Associate Professor
David Langford, Associate Professor
Carolyn Maynard, Assistant Professor
Linda Moore, Associate Professor
Linda Steele, Associate Professor
Yvonne Yousey, Assistant Professor

M.S.N. : Family Nurse Practitioner

The Family Nurse Practitioner (FNP) program prepares advanced practice nurses to deliver primary care to families across the life span. The program underscores the needs of culturally diverse families in rural and medically underserved areas and equips students to provide comprehensive care in the following areas: prevention, health maintenance and health promotion. The School Nurse Option within the Family Nurse Practitioner concentration offers nurses the opportunity to provide primary care to students and their families in schools, school-based clinics, or school-linked clinics and assume leadership roles in school health programs. Graduates of the program are eligible to take the national American Nurses Association or the American Academy of Nurse Practitioners credentialing examination for the family nurse practitioner. Graduates of the FNP program are eligible to apply to practice as nurse practitioners in the state(s) of their choice

Additional Admission Requirements

Admission offered once per year in Fall. Applications must be received by March 15 for Fall admission. Rolling admission (processed as received) for School Nurse Option. A statement of purpose is required that explains the applicant's career goal in relation to primary care and family practice.

Prerequisite Requirements

1) Undergraduate statistics course with a grade of C or better
2) Current encumbered licensure as an RN in North Carolina
3) One to two years recent clinical experience as an RN
4) Bachelor of Science in Nursing (BSN) degree from a nationally accredited program with an overall GPA of 3.0 (on a 4.0 scale) on the last 60 semester hours
5) Computer competency
6) Graduate Record Exam (GRE) – score of 500 on each of 2 out of 3 sections or Miller Analogy Test (MAT) – score of 40 or above.

Degree Requirements

The FNP concentration requires completion of 49 semester hours. The FNP with the School Nurse Option requires completion of 55 semester hours

Core Courses (15 hours)

NURS6101	Theoretical Basis for Nursing Practice (3)
NURS6115	Health Policy and Planning in the U.S. (3)
NURS6160	Research in Nursing and the Health Professions (3)
NUCN6201	Community Theory and Assessment (1)
NUCN6401	Community Assessment Lab (1)
NURS6210	Family Health in Advanced Practice Nursing (2)
NURS6105	Roles and Issues in Advanced Practice Nursing (2)

Specialty Concentration (25)

NURS6220	Pharmacotherapeutics in Advanced Nursing Practice (3)
NURS6230	Advanced Health Assessment and Diagnostic Reasoning (2)
NURS6430	Advanced Health Assessment Practicum (1)
NUNP6240	Advanced Primary Care of Women (3)
NUNP6440	Advanced Primary Care of Women Practicum (2)
NUNP6250	Advanced Primary Care of Adults (3)
NUNP6450	Advanced Primary Care of Adults Practicum (2)
NUNP6260	Advanced Primary Care of Children and Adolescents (3)
NUNP6460	Advanced Primary Care of Children and Adolescents Practicum (2)
NUNP6400	Internship in Family Health Nursing (4)

Cognate Courses (6 hours)

BIOL6050	Special Topics in Physiology (Pathophysiology) (3)
STAT6027	Topics in Statistics (3)

School Nurse Option (II)

Requires the above courses with the following addition:

NUCN6202	Advanced Nursing Care in the Community (3)

One 3-credit elective from an approved list (3)

Internships

NUNP6400 Internship in Family Health Nursing (240 hours)

Practica

A total of 660 hours clinical practice experience is required to complete the program

Electives

None required for the traditional FNP major. School Nurse option within the FNP tract requires one approved elective (3 hrs)

Advising

Faculty advising required each semester.

Research Opportunities

Students who choose to do so will have the opportunity to serve as Research Assistants on faculty research projects.

Post-Master's Certificate in Family Nurse Practitioner (FNP)

The graduate certificate program for the Family Nurse Practitioner consists of specialty courses in advanced practice nursing (18 - 23 graduate credit hours). Students having already completed the equivalent of one of the 5-credit pairs of didactic/clinical courses in a focused are (Adults, Women, or Children) will not be required to complete the equivalent paired courses for up to 5 credits, provided that they will, upon completion of the program, meet the minimum number of supervised clinical hours required to sit for the national certification exam. This certificate program will prepare nurses holding masters degrees in nursing to enter advanced practice nursing as a family nurse practitioner to function in diverse primary care settings in the community.

The recipients of its certificate would be eligible to take the American Nurses Credentialing Center (ANCC) examination for Family Nurse Practitioners or the American Academy of Nurse Practitioner (AANP) examination for the family nurse practitioner. Course work must be completed within four years and a 3.0 (B) grade point average is required. Students will complete 5 specialty core courses and 5 clinical courses. This program can be completed in one year of full time study or two years part time study.

Admission Requirements

1) A masters degree in nursing from a nationally accredited nursing program
2) Satisfactory GRE or MAT scores
3) Written application to graduate admissions
4) Unencumbered North Carolina License as a Registered Nurse
5) Official transcripts
6) Graduate Health Assessment course equivalent within the last 3 years
7) Graduate Pharmacology course equivalent within the last 3 years
8) Graduate Pathophysiology within the last 3 years

Certificate Requirements

NUCN6201 Community Theory and Assessment (1)
NUCN6401 Community Assessment Lab (1)
NURS6210 Family Health in Advanced Practice Nursing (2)
NUNP6240 Advanced Primary Care of Women (3)*
NUNP6440 Advanced Primary Care of Women Practicum (2)*
NUNP6250 Advanced Primary Care of Adults (3)**
NUNP6450 Advanced Primary Care of Adults Practicum (2)**
NUNP6260 Advanced Primary Care of Children (3)***
NUNP6460 Advanced Primary Care of Children Practicum (2)***
NUNP6400 Internship in Family Health (4)

*NUNP 6240 Advanced Primary Care of Women (3) and NUNP 6440 Advanced Primary Care of Women Practicum (2) is not required for certified Women's Health Nurse Practitioners, provided that the required number of supervised clinical hours to sit for the certification as an FNP is met.

**NUNP 6250 Advanced Primary Care of Adults (3) and NUNP 6450 Advanced Primary Care of Adults Practicum (2) is not required for certified Adult Nurse Practitioners, provided that the required number of supervised clinical hours to sit for certification as an FNP is met.

***NUNP 6260 Advanced Primary Care of Children (3) and NUNP 6460 Advanced Primary Care of Children Practicum (2) is not required for certified Pediatric Nurse Practitioners, provided that the required number of supervised clinical hours to sit for certification as an FNP is met.

COMMUNITY HEALTH NURSING

Family & Community Nursing
Colvard 2038
704-687-4683
http://www.health.uncc.edu

Degree
M.S.N.

Coordinator
Gwendolyn Foss, Associate Professor

Graduate Faculty
William Cody, Professor
Lienne Edwards, Associate Professor
Gwen Foss, Associate Professor
Janice Janken, Associate Professor
David Langford, Associate Professor

M.S.N. : Community Health
Coursework and internship leading to MSN with a community health nursing focus in population health or school health.

Additional Admission Requirements
Admission requirements follow those of the Graduate School with the additions below. Rolling admission - applicants may apply any time during the school year.

Prerequisite Requirements
1) Undergraduate statistics course with a grade of C or better.
2) Current and active RN license.
3) Bachelor of Science degree from a nationally accredited College or University with an overall GPA of at least 3.0 (on a 4.0 scale) on the last 60 semester hours.
4) Basic computer competency.

Degree Requirements
The concentration requires completion of 45 semester hours in approved courses, including core courses and internship:

Core Courses (15 hours)
- NURS6101 Theoretical Basis for Nursing Practice (3)
- NURS6105 Roles and Issues in Advanced Practice Registered Nursing (2)
- NURS6115 Health Policy and Planning in the U.S. (3)
- NURS6160 Research in Nursing and Health Professions (3)
- NUCN6201 Community Theory and Assessment (1)
- NUCN6401 Community Assessment Lab (1)
- NURS6210 Family Health in Advanced Practice Nursing (2)

Specialty Concentration (18 hours)
- NUCN6202 Advanced Nursing Care in the Community (3)
- NUCN6203 Prevention and Diverse Populations (3)
- NUCN6204 Synthesis in Community Health Nursing (2)
- NUCN6404 Synthesis in Community Health Nursing Lab (1)
- NUCN6405 Community Health/School Nursing Internship (3)
- NUCN6406 Community Health/School Nursing Internship (3)

Cognate (12 hours)
- HADM6130 Health Law and Ethics (3)
- HLTH6189 Community Epidemiology (3)
- STAT6027 Topics in Statistics (3)
- Two Required Guided Elective (3 hours)

NOTE: For **School Nurse Option** in Community Health all the above courses apply with the exception that NUCN 6207 Management of the Child and Adolescent Health in Schools (3) replaces NUCN 6203 Prevention and Diverse Populations (3), BIOL 6050 Advanced Physiology and NURS 6230 Health Assessment and NURS 6430 Health Assessment Practicum replace cognate courses NADM 6130 Health Law and Ethics and the Guided Elective. Internships will be school health focused.

Assistantships
Graduate Assistantships available for master's degree students are limited in number. For information on graduate assistantships and other financial aid, please contact the Office of Student Services, College of Health and Human Services, UNC Charlotte, 9201 University City Blvd., Charlotte, NC 28223-0001. 704-687-4690.

Internships
- NUCN 6405 Community Health Nursing Internship I (180 hours)
- NUCN 6406 Community Health Nursing Internship II (180 hours)

Practica
A total of 480 hours of supervised community health nursing practice is required to complete the program.

Track Descriptions
The Community Health Nursing specialty prepares nurses to assume leadership roles in assessing communities, identifying high risk populations, and to work with those populations to develop culturally sensitive, acceptable and realistic community-based nursing services. By preparing nurses to develop such services, the program helps meet

the health care needs of North Carolina residents who live in urban and rural areas. The School Nurse option within the Community Health Nursing track offers nurses the opportunity to assume leadership roles in schools and surrounding communities to plan and implement programs.

Capstone Experiences

NUCN 6204 Synthesis in Community Health Nursing (2)
NUCN 6404 Synthesis in Community Health Nursing Lab (1)

Minors

Two options within the Community Health Nursing Track – Population-Focused Nursing and School Health Nursing

Electives

Two required.

Advising

Faculty advisor assigned at time of admission, advising required each semester.

Licensure

Current unencumbered licensure as a Registered Nurse.

Application for Degree

Standard University procedures.

Research Opportunities

Students who choose to do so will have the opportunity to serve as Research Assistants on faculty research projects.

Financial Aid/Financial Assistance

Federal Traineeships sometimes available to full time students. Other financial aid information available from the Office of Student Services in the College of Health and Human Services.

Program Certifications/Accreditations

MSN Program is nationally accredited by CCNE.

ADULT PSYCHIATRIC MENTAL HEALTH NURSING

Family & Community Nursing

Colvard 2038
704-687-4683
http://www.health.uncc.edu/

Degree

M.S.N.

Coordinator

Ann Newman, Associate Professor

Graduate Faculty

William Cody, Professor
Lienne Edwards, Associate Professor
David Langford, Associate Professor
Carolyn Maynard, Assistant Professor
Jane Neese, Associate Professor
Ann Newman, Associate Professor

M.S.N. : Adult Psychiatric Mental Health

The Adult Psychiatric Mental Health Clinical Nurse Specialist track focuses on the role of the advanced practice PMHN in the assessment and management of individuals, groups, and communities. Graduates of this program will be prepared to complete requirements for certification as a Clinical Specialist in Adult Psychiatric and Mental Health Nursing.

Additional Admission Requirements

A Graduate Record Exam (GRE) (score of 500 on each of 2 of the 3 sections) or the Miller Analogy (MAT) (score of 40 or above) is required. Rolling admissions: applicants may apply any time during the school year.

Prerequisite Requirements

1) Undergraduate statistics course with a grade of C or better;
2) Current encumbered licensure as an RN in North Carolina;
3) Bachelor of Science in Nursing (BSN) degree from a nationally accredited program with an overall GPA of at least 3.0 (on a 4.0 scale); and
4) A GPA of at least 3.0 on the last 60 semester hours. Prerequisite: Computer competency.

Degree Requirements

This program requires 43 semester hours as follows:

Core Courses (15 hours)

NURS6101 Theoretical Basis for Nursing Practice (3)
NURS6115 Health Policy and Planning in the U.S. (3)
NURS6160 Research in Nursing and Health Professions (3)
NURS6210 Family Health in Advanced Practice Nursing (2)
NURS6105 Roles and Issues in Advanced Practice Registered Nursing (2)
NUCN6201 Community Theory and Assessment (1)
NUCN6401 Community Assessment Lab (1)

Specialty Concentration (24 hours)

NURS6220	Pharmacotherapeutics for Advanced Nursing Practice (3)
NURS6230	Advanced Health Assessment and Diagnostic Reasoning (2)
NURS6430	Advanced Health Assessment Practicum (1)
NUMH6200	Psychiatric Mental Health Theories and Constructs of Mental Health Care (3)
NUMH6130	Advanced Psychiatric Mental Health Nursing Practice with Individuals (2)
NUMH6430	Practicum in Advanced Practice Psychiatric Mental Health Nursing with Individuals (2)
NUMH6135	Advanced Psychiatric Mental Health Nursing Practice with Groups and Communities (2)
NUMH6435	Practicum in Advanced Practice Psychiatric Mental Health Nursing with Groups and Communities (2)
NUMH6201	Seminars in Advanced Practice Psychiatric Mental Health Nursing (1)
NUMH6401	Internship in Advanced Psychiatric Mental Health Nursing Practice (4)

Cognate Courses (6 hours)

BIOL6050	Advanced Human Physiology (3)
STAT6027	Topics in Statistics (3)

Assistantships

Graduate Assistantships available for master's degree students are limited in number. For information on graduate assistantships and other financial aid, please contact the Office of Student Services, College of Health and Human Services, UNC Charlotte, 9201 University City Blvd., Charlotte, NC 28223-0001, 704-687-4690.

Internship

NUMH6401	Internship in Advanced Psychiatric-Mental Health Nursing Practice (240 hours)

Practica

A total of 540 hours of supervised clinical practice experience is required to complete the program.

Advising

Faculty advising is required each semester.

Licensure

Current unencumbered licensure as a Registered Nurse in North Carolina.

Research Opportunities

Students who choose to do so will have the opportunity to serve as Research Assistants on faculty research projects.

Financial Assistance

Federal Traineeships are sometimes available to full time students.

Program Certifications/Accreditations

Overall MSN Program is accredited by CCNE

POST-MASTER'S CERTIFICATE IN NURSING EDUCATION

Family & Community Nursing

Colvard 2038
704-687-4683
http://www.health.uncc.edu/

Coordinator

Ann Newman, Associate Professor

Program of Study

The Post-Master's Graduate Certificate in Nursing Education is designed to prepare nurses who have a Master of Science in Nursing to become educational leaders in academic and clinical settings. This certificate consists of a three semester sequence of four courses, for a total of twelve semester hours and can be completed within one calendar year. The Post Master's Graduate Certificate provides students with the coursework needed to enhance the student's professional teaching skills. Note: This program is offered over the Internet.

Admission Requirements

1) Master of Science in Nursing (MSN) degree from a nationally accredited program
2) Current unrestricted licensure as a Registered Nurse
3) Two official transcripts of all academic work attempted beyond high school
4) A statement of purpose which explains the applicant's career goals
5) Three letters of professional recommendation

Certificate Requirements

This program requires 12 semester hours as follows:

NURS6301	Curriculum and Instruction in Nursing Education
NURS6302	Trends and Issues in Nursing Education
NURS6303	Instructional Technology in Nursing Education
NURS6304	Teaching Practicum in Nursing Education

Practica

A total of 15 hours of supervised classroom teaching experience, individually arranged, is required to complete the program.

Advising
Faculty advising is required each semester.

Licensure
Current unencumbered licensure as a Registered Nurse in North Carolina.

Other Requirements

Access to Technology
Coursework will be provided using the Internet. These courses will not require students to assemble as a group at a designated site. Instead, students will be able to participate individually in these courses, most typically from their home or from another location where they have access to the Internet.

Minimum hardware specifications:
1) Processor: 450MHZ Pentium or Pentium-compatible
2) RAM: 128MB RAM (256 MB highly recommended)
3) Hard drive: 3 GB (3000 MB) of free space available after all software has been installed
4) 1.44 MB Floppy drive
5) CD-ROM drive (12X recommended) or DVD/CD combination drive
6) Video: 800x600 resolution, 16000 colors (1024x768, High or True Color highly recommended)
7) 16 Bit Sound Card (SoundBlaster compatible) with speakers
8) 56 K Modem to be used with Internet Service Provider (ISP). (Not required if using cable-based or DSL ISP)
9) Printer
10) Television and VCR
11) Microsoft Windows 98 or higher (e.g.. NT, 2000, ME, XP)
12) Microsoft Office 2000 or later (including Word, Excel, PowerPoint)
13) Internet Explorer or Netscape Navigator in a version compatible with currently used version of WebCT (online courseware). Currently supported versions are Internet Explorer 5.0 to 6.0 (but not 5.5 SPI), Netscape 4.76 and 6.21 (for updates to WebCT browser information, visit http://www.uncc.edu/webct/WCT_FACULTY/information/browsersetup.html)
14) Virus detection software with current virus definitions
15) Access through student's Internet Service Provider (ISP) with (1) a connect rate of at least 56 K, (2) ability to ftp, telnet and browse the World Wide Web, (3) e-mail with ability to send and receive attachments, (4) compatible browser plug-ins as required by the instructor. Please Note: An ISP that does not offer true internet access or that "times out" after one hour will not be satisfactory for this program.

Courses in Nursing

NUAN 6151. Principles of Nurse Anesthesia I. (3) Prerequisite: NURS 6156. Overview of the principles, techniques and equipment necessary for the administration of anesthesia for the general surgical client. *(Spring, Summer)*

NUAN 6152. Principles of Anesthesia II. (3) Prerequisite: NURS 6151. Specific techniques of nurse anesthesia practice for selected clients. *(Summer)*

NUAN 6153. Principles of Anesthesia III. (3) Prerequisite: NURS 6152. Advanced nurse anesthesia practice for selected clients *(Fall)*

NUAN 6154. Pharmacology for Non Anesthetic Agents. (4) Prerequisite: Consent of the Department. Introduction to the pharmacology of anesthetic drugs and adjunctive agents, including general pharmacological principles, pharmocokinetics and pharmacodynamics. *(Fall)*

NUAN 6155. Pharmacology in Anesthetic Agents. (4) Prerequisite: NURS 6154. Continuation of Pharmacology I with emphasis on the clinical use of anesthetic agents and adjunctive drugs. *(Spring)*

NUAN 6156. Applied Physics and Chemistry in Nurse Anesthesia. (3) Prerequisite: Consent of the Department. Basic laws and principles of physics, inorganic chemistry and organic chemistry as they apply to the clinical practice of nurse anesthesia. *(Fall)*

NUAN 6157. Applied Pathophysiology in Nurse Anesthesia I. (3) Prerequisite: BIOL 6050. Pathophysiology of the nervous and cardiovascular systems with emphasis on their anesthetic implications. *(Spring)*

NUAN 6158. Applied Pathophysiology in Nurse Anesthesia II. (3) Prerequisite: NURS 6157. Pathophysiology of the respiratory, endocrine, excretory and renal systems with emphasis on their anesthetic implications *(Summer)*

NUAN 6159. Professional Aspects of Nurse Anesthesia. (1) Prerequisite: NUAN 6153. Overview of the legal aspects regarding the practice of nurse anesthesia and information about the American Association of Nurse Anesthetists, including its history and Councils on Accreditation, Licensure and Practice. *(Spring)*

NUAN 6485. Clinical Residency in Nurse Anesthesia I. (5) Prerequisite: NUAN 6153. Clinical application of didactic material from the nurse anesthesia curriculum through beginning level practice in the role of a nurse anesthetist. Conferences during the clinical residency provide opportunities to review current research and

practice issues. *Pass/Unsatisfactory* grading only. *(Fall, Spring)*

NUAN 6486. Clinical Residency in Nurse Anesthesia II. (5) Prerequisite: NUAN 6485. Continuation of the clinical application of didactic material from the nurse anesthesia curriculum with focus on utilization of additional anesthesia techniques and increased skills development. Pass/Unsatisfactory grading only. *(Spring, Summer)*

NUAN 6487. Clinical Residency in Nurse Anesthesia III. (5) Prerequisite: NUAN 6486. Incorporation of the content of the nurse anesthesia curriculum with opportunities to begin synthesis of all didactic material and techniques for efficient clinical practice. *(Fall, Summer)*

NUAN 6489. Clinical Residency in Nurse Anesthesia IV. (5) Prerequisite: NUAN 6487. Non-credit clinical residency for synthesis of all didactic material and techniques of nurse anesthesia clinical practice, promotion of professional practice, and preparation of the student for the licensure examination. *(Fall, Spring)*

NUCI 6100. Chronic Illness Concepts and Theories for Advanced Nursing Practice. (3) Pre or Corequisite: NURS 6101. Focus on contemporary chronic illness concepts and theories relevant to individuals and families coping with long-term health deviations and their impact on society. Emphasis on knowledge and skills needed for advanced nursing practice. *(Fall)*

NUCI 6106. Health Care Management of Adults I. (3) Prerequisite: BIOL 6050 (Pathophysiology), NURS 6230, 6430. Pre or Co-requisite NUCI 6100, 6220. Corequisite NURS 6108. Designed to provide students with the opportunity to integrate knowledge from advanced assessment, Pathophysiology, pharmacotherapeutics, theory and research to provide the advanced practice nurse with the requisite skills in the management of acutely ill adults with chronic illness in a variety of settings. Emphasis is placed on the use of diagnostic reasoning skills in the diagnosis pharmacological, and non pharmocological management of acutely ill adults with chronic illness. Application of models and theories to guide advanced nursing practice and planned research based care of adult with chronic illness is expected. *(Fall)*

NUCI 6107. Health Care Management of Adults II. (2) Prerequisite: BIOL 6050 (Pathophysiology), NURS 6230, 6430, NUCI 6100. Pre or Co-requisite NURS 6220. Builds on knowledge of advanced assessment, pathophysiology, pharmacotherapeutic, and theory and research to provide the advance practice nurse with the framework to manage adults with chronic illness in the ambulatory setting. Emphasis is placed on a wellness focus in the care of adults throughout the life span with common reoccurring acute illnesses and stable chronic conditions. Models of health promotion, disease prevention, health education and wellness will be used to guide the advanced practice nurse in assessing, diagnosing and planning care for adults. The case study approach will be used as a framework to implement the diagnostic reasoning and clinical decision making process. *(Spring)*

NUCI 6108. Health Care Management of Women (1) Co-requisite NUCI 6107. This course will build on knowledge of advanced assessment, pathophysiology, pharmacotherapeutics, and theory and research to provide the advance practice nurse with the framework to manage the health care of women. Emphasis is placed on a wellness focus in the care of women throughout the life span with common reproductive needs and/or disorders, reoccurring acute illnesses and stable chronic conditions. Models of health promotion, disease prevention, health education and wellness will be used to guide the advanced practice nurse in assessing, diagnosing and planning care for women. The case study approach will be used as a framework to implement the diagnostic reasoning and clinical decision- making process. *(Fall)*

NUCI 6401. Advanced Practice Nursing in Ambulatory Care. (4) Pre or Co-requisite NUCI 6106, 6108. Emphasis on the role of the advanced practice nurse in promoting health life-styles to prevent or minimize the effects of chronic illness. Students will incorporate critical thinking and diagnostic reasoning in assessing diagnosing, monitoring, coordinating, managing outcomes and communicating health care findings of adults and their families in ambulatory care settings. (240 clinical hours and scheduled clinical seminar) *(Fall)*

NUCI 6402. Advanced Practice Nursing in Acute Care. (4) Co-requisite: NUCI 6107. Focuses on the care of adults who have acute episodes of illness and require care in acute care settings. Emphasis is placed on alterations in oxygenation, metabolism, mobility, and immunity experienced by acutely ill adults. Students will incorporate critical thinking and diagnostic reasoning, in assessing, diagnosing, monitoring, coordinating, managing outcomes and communicating health care findings of adults. (240 clinical hours and scheduled clinical seminar) *(Spring)*

NUCI 6403. Advanced Practice Nursing in Chronic Care. (4) Prerequisite or Co-requisite NUCI 6107. Focus on outcome management of chronically ill clients with multi-system problems. Emphasis on the role of the advanced practice nurse in helping chronically ill adults and their families manage the effects of and achieve optimum outcomes in chronic illness. (240 clinical hours and scheduled clinical seminar). *(Spring)*

NUCI 6601. Synthesis in Advanced Practice Nursing I. (1) Pre or Co-requisite NUCI 6401. Emphasis is on synthesizing theory, research and practice to promote, maintain and restore health and quality of life in adults with chronic illness in the blended role of the Advanced Practice Nurse. Preparation to assume the role of the

advanced practice nurse will include the development of resume, job description, and marketing techniques. *(Fall)*

NUCI 6602. Synthesis in Advanced Practice Nursing II. (2) Prerequisite NUCI 6601. Emphasis is on synthesizing theory, research and practice to promote, maintain and restore health and quality of life in adults with acute and/or chronic illness in the blended role of the Advanced Practice Nurse. This course will culminate in a capstone experience that integrates research, theory and practice. *(Spring)*

NUCN 6150. Health of Immigrant Populations in the United States. (3) Examines the health of immigrant populations within the context of nation of origin, migration and resettlement. Explores theoretical frameworks for understanding resettlement and subsequent health status. Examines the role of traditional healing modalities and essential components of culturally competent health care. *(Alternate Years)*

NUCN 6201. Community Theory and Assessment. (1) Corequisite NUCN 6401. Provides an overview of community health nursing with a focus on community organization and dynamics. Examines strategies of assessing community and community groups emphasizing culturally competent approaches. NUCN 6201 must be taken with the lab NUCN 6401 Lab. *(Fall, Spring)*

NUCN 6202. Advanced Nursing Care in the Community. (3) Prerequisite: NUCN 6201, NUCN 6401 or permission of the instructor. Focuses on community-based interventions which successfully work with communities to plan, implement, and evaluate health programs in urban and rural settings. Special emphasis is on school health programs. Uses Healthy People 2010 and outcome evaluation in planning and implementing health programs. Explores use of social marketing in prevention programs. *(Fall)*

NUCN 6203. Prevention and Diverse Populations. (3) Focuses on theoretical and analytical perspectives of assessing risk and implementing prevention services in diverse populations with specific emphasis on Healthy People 2010. Ethics of access and resource distribution and culture in a global environment are stressed. *(Spring)*

NUCN 6204. Synthesis in Community Health Nursing. (2) Prerequisite: NUCN 6405, Pre or Corequisite: NUCN 6406, NUCN 6404. Corequisite NUCN 6404. Applies research and theoretical principles of community and school nursing practice, problem-solving and political process to clinical internship. Synthesizes and presents mastery of concepts. Must be taken with lab NUCN 6404. *(Fall)*

NUCN 6207. Management of Child and Adolescent Health in Schools. (3) Prerequisite: NURS 6230. Knowledge and skills for advanced management of the health of children and adolescents in schools. Builds on knowledge base of child and adolescent growth and development. Concepts of health promotion, family, behavioral health, cultural and environmental variations are integrated throughout the course. *(Spring)*

NUCN 6401. Community Assessment Lab. (1) Corequisite NUCN 6201. Students conduct a community needs assessment for selected community agencies. Must be taken with NUCN 6201. 60 clinical hours. *(Fall, Spring)*

NUCN 6404. Synthesis in Community Health Nursing Lab. (1) Prerequisite: NUCN 6405, Pre- or Corequisite: NUCN 6406, NUCN 6204. Corequisite NUCN 6204. Clinical experience in a community-based agency or school applying principles of policy and politics in allocation and distribution of fiscal, material and human resources to address health needs. Must be taken with NUCN 6204. *(Fall)*

NUCN 6405. Community Health/School Nursing Internship I. (3) Prerequisite: NUCN 6201, 6401, HPKD 6189 or equivalent. Pre- or corequisite NUCN 6202, 6203. Provides clinical application that builds on course work. The internship is student-determined and designed to reflect population-based practice in multiple settings. The internship is precepted by a professional affiliated with a community-based organization. The internships are precepted clinical experiences that require 12 hours of practice per week. The total clinical hours for one semester are 180. The internship is assigned with the assistance of the course faculty and/or the student's advisor. NUCN 6405 and NUCN 6406 must be taken adjacent semesters as the internship in one agency extends over two semesters. *(Fall)*

NUCN 6406. Community Health/School Nursing Internship II. (3) Prerequisite: NUCN 6201, 6401, HPKD 6189 or equivalent.. Pre- or corequisite NUCN 6202, 6203. Continuation of clinical application from NUCN 6405. The internship is precepted by a professional affiliated with a community-based organization. Internships require 12 hours of practice per week. The total clinical hours for one semester are 180. NUCN 6405 and NUCN 6406 must be taken adjacent semesters as the internship in one agency extends over two semesters. *(Spring)*

NUMH 6130. Advanced Psychiatric Mental Health Nursing Practice with Individuals. (2) Prerequisite: NUMH 6200; Corequisite: NUMH 6430. Provides a framework for the examination and application of the therapeutic process by advanced psychiatric mental health nurses with emphasis on theories from nursing as well as psychiatric, behavioral, and cultural sciences. Focuses on the development of the advanced psychiatric mental health nurse in a managed care or traditional health care environment as an individual therapist. *(Spring, Alternate Years)*

NUMH 6135. Advanced Practice Psychiatric Mental Health Nursing Practice with Groups and Communities. (2). Prerequisites: NUMH 6130 & 6430; Corequisite: NUMH 6435. Examination of the therapeutic process of advanced psychiatric mental health nursing with emphasis on groups and communities. Focuses on development of the roles of the advanced practice nurse in a managed care and traditional mental health care environment as a group therapist in the promotion of mental health in community settings. *(Fall, Alternate Years)*

NUMH 6200. Psychiatric Mental Health Theories and Constructs of Mental Health Care. (3) Prerequisite: or Corequisite NURS 6101. Examination of theoretical frameworks underlying the practice of advanced psychiatric mental health nursing. Integration of biological, psychological, sociological and nursing theories into the student's individual theoretical framework for practice. *(Fall, Alternate years)*

NUMH 6201. Seminars in Advanced Practice Psychiatric Mental Health Nursing. (1). Prerequisites: NUMH 6135 & NUMH 6435; Corequisite: NUMH 6401. Focuses on the components and professional issues of the advanced practice psychiatric mental health nurse in the care of the individuals, groups, and communities. Professional practice issues will be addressed. One hour of seminar/case presentation. *(Spring, Alternate Years)*

NUMH 6401. Internship in Advanced Practice Psychiatric Mental Health Nursing. (4) Prerequisite: NUMH 6135 and NUMH 6435; Corequisite NUMH 6201. Focuses on the application of the advanced practice psychiatric mental health nurse's role in the care of the individuals, groups, and communities. Professional practice issues will be addressed with preceptors and faculty. *240 clinical practice hours. (Spring, Alternate Years)*

NUMH 6430. Practicum in Advanced Practice Psychiatric Mental Health Nursing with Individuals. (2) Prerequisites: NUMH 6200; Corequisite: NUMH 6130. Application of the individual psychotherapeutic process incorporating therapeutic modalities from nursing as well as psychiatric, behavioral, and cultural sciences in selected clinical experiences. Clinical seminar, clinical conference, and faculty/peer supervision provide opportunities for development of the advanced practice psychiatric mental health nurse in a managed care or traditional health care environment. *120 clinical practice hours. (Spring, Alternate Years).*

NUMH 6435. Advanced Psychiatric Mental Health Nursing Practice with Groups and Communities Practicum. (2) Prerequisites: NUMH 6130 & NUMH 6430. Corequisites: NUMH 6135. Examination and application of the therapeutic process with emphasis on groups and communities. Clinical seminar, clinical experience and supervision, provide opportunity for development of the advanced practice psychiatric mental health nurse as a group therapist and in promotion of mental health in community settings in a managed care and traditional health care environment. *120 clinical practice hours. (Fall, Alternate Years)*

NUNA 6175. Theory and Application of Administration to Nursing Systems. (3) Prerequisites: NURS 6101, NURS 6160. This course is designed to examine critical nursing management issues, and selected theoretical frameworks that serve to synthesize the disciplines of nursing and management. A systems approach provides the central framework for the study of nurse staffing, utilization, patient acuity and quality assurance components to the professional practice of nursing. *(Fall, every other year, during odd years)*

NUNA 6490. Advanced Practicum in Nursing Administration. (3) Prerequisite: NURS 6101, NURS 6160. This practicum provides a guided experience in any agency or agencies appropriate for the students selected concentration area. Designed as a capstone course of the dual master's program in Nursing Service Administration and Health Administration. Students are expected to demonstrate theory and practice under the supervision of selected administrative preceptors. *(Spring, every other year.)*

NUNP 6240. Advanced Primary Care of Women. (3) Prerequisite: NURS 6220, 6230, 6430, NUNP 6250 and 6450. Focuses on the role of the family nurse practitioner in the primary care of women family members. The course uses a developmental approach to provide knowledge needed for advanced understanding of common health concerns of women. Concepts of health promotion, health maintenance, cultural competence and environmental variations are integrated throughout the course. *(Spring)*

NUNP 6250. Advanced Primary Care of Adults. (3) Prerequisite: NURS 6210, 6220, 6230, 6430. Corequisite NUNP 6450. Focuses on the role of the family nurse practitioner in the primary care of adult family members. Uses a developmental approach to provide knowledge for advanced clinical decision making relating to adults with common health problems, acute episodic illnesses and stable chronic diseases. Concepts of health promotion, health maintenance, cultural competence and environmental variations are integrated throughout the course. *(Fall)*

NUNP 6260. Advanced Primary Care of Children and Adolescents. (3) Prerequisite: NURS 6220, 6230, 6430, NUNP 6250, 6450. Corequisite NUNP 6460. Focus is on the role of the family nurse practitioner in the primary care of families with children and adolescents. The course uses a developmental approach to providing knowledge needed for advanced clinical decision making related to children with common health problems including acute episodic illness and stable chronic disease. Concepts of health promotion and maintenance and

cultural and environmental variables are integrated throughout. *(Spring)*

NUNP 6400. Internship in Family Health Nursing. (4) Prerequisite: NUNP 6240, 6250 and 6260. Role of the family nurse practitioner in the assessment and management of the health of individuals and families across the lifespan. Implementation of clinical decision making skills in family health promotion and management of acute episodic and stable chronic conditions and consideration of professional practice issues. Includes one credit hour of seminar/case presentation and three credit hours of clinical practice (240 clinical hours) *(Summer)*

NUNP 6440. Advanced Primary Care of Women Practicum. (2) Prerequisite: NURS 6220, 6230, 6430, NUNP 6250, 6450. Corequisite NUNP 6240. This clinical course is designed to provide family nurse practitioner student with the opportunity to manage the healthcare of women in primary care settings. The course uses a developmental approach to increase competence in providing care to women from diverse backgrounds. The focus in on the synthesis of knowledge from the physical and psychosocial sciences to formulate advanced clinical decisions effective in the eh health care of women and their families. 120 clinical hours. *(Spring)*

NUNP 6450. Advanced Primary Care of Adults Practicum. (2) Corequisite NUNP 6250. This clinical course is designed to provide family nurse practitioner students the opportunity to manage the health care of adults in primary care settings. The course uses a developmental approach to manage the care of adults from diverse backgrounds. The focus is on the synthesis of knowledge from the physical and psychosocial sciences to formulate advanced clinical decisions effective in the health care of adults and their families. 120 clinical hours. *(Fall)*

NUNP 6460. Advanced Primary Care of Children and Adolescents Practicum. (2) Prerequisite: NURS 6220, 6230, 6430; NUNP 6250, 6450. Corequisite NUNP 6260. This clinical course is designed to provide family nurse practitioner students the opportunity to manage the health care of children and adolescents in primary care settings. The course uses a developmental approach to guide management of the healthcare of children and adolescents from diverse backgrounds. The focus is on the synthesis of knowledge from the physical and psychosocial sciences to formulate advanced clinical decisions effective in the health care of children and adolescents and their families. 120 clinical hours. *(Spring)*

NURS 5090. Selected Topics in Nursing. (1-3) Prerequisite: Permission of instructor. Topics to be chosen from the specialties of nursing. May be repeated for credit as topics vary. No more than six hours of topics and/or independent study course credit in nursing may be applied toward degree requirements. *(Fall, Spring)*

NURS 6101. Theoretical Basis for Nursing Practice. (3) Philosophical foundations and knowledge development in nursing. Evaluation of theories, models and their relationships to practice. *(Fall, Spring, Odd Summers)*

NURS 6105. Roles and Issues in Advanced Practice Registered Nursing. (2) Examine issues affecting the emerging role of the advanced practice registered nurse. Designed to facilitate the role development of nurses who plan to practice within a specific clinical area of advanced nursing practice. Core concepts include subroles of advanced nursing practice, standards of practice, legal and professional issues affecting the Advanced Practice Nurse. Examination and discussion of current practice issues will provide a framework that will enable the student to assume the role of advanced practice registered nurse in the changing health care environment. *(Fall, Spring)*

NURS 6115. Health Policy and Planning in the U.S. (3) Overview of health care delivery system in the United States. Analysis of health care policy, financing, political trends, ethical, and professional issues, including the theoretical underpinning of policy making, the empirical thrusts of policy analysis and research and the relationship between policy making and the political process. *(Fall, Spring, Odd Summers)*

NURS 6160. Research in Nursing and the Health Professions. (3) Prerequisite: Nursing Majors: NURS 6101; Health Education majors; HPKD 6143. Application of inquiry methods to problems in nursing and the health professions. *(Fall, Spring, Even Summers)*

NURS 6162. Information Resource Management. (3) Adaptation of technological innovation (Informatics) to the field of nursing, including theoretical and applied computer utilization, patient acuity and quality assurance components to the professional practice of nursing. This course is cross referenced with HADM 6146 Information Resource Management, which is taught every spring. *(On demand)*

NURS 6175. Nursing Informatics. (3) Adaptation of technological innovation (Informatics) to the field of nursing, including theoretical and applied computer utilization, patient acuity and quality assurance components to the professional practice of nursing. *(On demand)*

NURS 6176. Nursing Data. (3) Prerequisite: NURS 6175. Data-information-knowledge continuum in nursing and its application to practice, emphasizing identification, systemization and use of nursing data for decision support and expert judgment. *(On demand)*

NURS 6210. Family Health in Advanced Practice Nursing. (2) Provides an overview of the family as the basic unit of advanced nursing care. Focuses on strategies

of family assessment, family empowerment, and family health promotion. Includes reviews of relevant theories, concepts and research for the assessment and management of family health and the analysis of the socio-cultural context of families. *(Fall, Spring)*

NURS 6220. Pharmacotherapeutics in Advanced Nursing Practice. (3) Principles of pharmacology and drug therapy for advanced nursing practice including legal and social considerations related to prescriptive authority and prescribing patterns. Satisfies NC Board of Nursing requirements for nurse practitioner. *(Fall, Spring)*

NURS 6230. Advanced Health Assessment and Diagnostic Reasoning. (2) Pre or corequisite:, BIOL 6050 Pathophysiology. Corequisite NURS 6430. This course provides knowledge and skills necessary for advanced practice nurses to synthesize concepts from nursing and the biopsychosocial sciences in the comprehensive health assessment of adults and children. The diagnostic reasoning process, differential diagnosis, advanced health evaluation techniques, laboratory tests, diagnostic studies and interpretation and evaluation of findings are incorporated into the course. *(Fall, Spring)*

NURS 6301. Curriculum and Instruction in Nursing Education. (3) On-line course. Theories and principles of adult learning. Curriculum/course planning, design, implementation, and evaluation. Creative teaching approaches and technologies. Evaluation of student learning, including test construction. Teaching/ learning/evaluation in the clinical setting.

NURS 6302. Trends and Issues in Nursing Education. (3) On-line course. Examination of current trends and issues that nursing educators face: faculty roles and responsibilities, student diversity, student roles and responsibilities, scholarship of teaching, leadership in nursing education, evaluation of teaching effectiveness, curriculum evaluation/accreditation, and legal and ethical issues.

NURS 6303. Instructional Technology in Nursing Education. (3) On-line course. Introduction to instructional design using a variety of computer and technology-based media. The focus is on assisting students to gain skills in choosing appropriate instructional technologies in enhancing learning in both traditional and clinically-based educational settings.

NURS 6304. Teaching Practicum in Nursing Education. (3) Prerequisites NURS 6301, 6302, 6303. Guided experience with a master teacher in nursing for classroom and clinical teaching and evaluation, planned in the student's locale by student and faculty, plus on-line discussion forum. Design of a teaching portfolio. Design, implementation, and evaluation of course/class/clinical content.

NURS 6430. Advanced Health Assessment Practicum. (1) Pre or corequisite:, BIOL 6050 Pathophysiology Co-requisite NURS 6230. This clinical practicum is designed to provide an opportunity for students to practice advanced health assessment skills on clients across the lifespan. Comprehensive health histories and physical examination techniques are used to complete a database on clients to formulate differential diagnoses and make advanced clinical decisions. 60 lab/clinical hours. *(Fall, Spring)*

NURS 6661. Research Seminar. (2) Prerequisite: NURS 6160 and graduate statistics. Application of inquiry methods to nursing problems including systematic observation and critical analysis of research methods. Submission of a written research or project proposal is required. *(On demand)*

NURS 6895. Independent Study. (1-3) Guided individual study in topics or issues related to nursing arranged with a faculty adviser. May be repeated for credit. No more than six hours of topics and/or independent study courses may be counted toward degree requirements. *(Fall, Spring)*

NURS 6962. Thesis. (1-3) Prerequisite: NURS 6160. Production of a piece of nursing research of investigation of a problem relevant to nursing which demonstrates contribution to professional knowledge through systematic investigation and participation in the process of peer reviewed research. *(Fall, Spring)*

NURS 7999. Graduate Residence. (1) Prerequisite: Consent of the adviser. Required of all graduate studies working on a thesis who are not enrolled in other graduate courses. *(Fall, Spring, Summer)*

SOCIAL WORK

Department of Social Work

351 Cato Hall
704-687-4076
http://www.health/uncc.edu

Degree

M.S.W.

Chairperson

Dr. Linwood H. Cousins, Interim Chair

Program Coordinator

Dr. Deana Morrow, Associate Professor

Graduate Faculty

A. Suzanne Boyd, Assistant Professor
Linwood Cousins, Associate Professor
James Dudley, Professor

Gay Jordan, Lecturer & Director of Admissions and Student Services
Terri Matthews, Lecturer
Valerie Miller, Lecturer & Director of Field Education
Deana F. Morrow, Associate Professor
Philip Popple, Professor
Marcia Shobe, Assistant Professor
Carole Winston, Assistant Professor

MASTER OF SOCIAL WORK

The Master of Social Work (MSW) degree prepares students for advanced social work practice with individuals, families, and small groups in a variety of public, voluntary, and proprietary human service settings. Graduates are skilled in addressing the many social and individual problems of society—especially for those who constitute membership in low income and vulnerable groups.

The course of full-time study over four semesters requires 60 hours of course work beyond the bachelor's degree from an accredited college or university. A structured part-time program is available that students can complete in three years. The UNC Charlotte MSW Degree is fully accredited by the Council on Social Work Education, the national accrediting organization for social work education programs.

The MSW curriculum concentration is in interpersonal practice which is centered in advanced social work practice with individuals, families, and small groups. In addition, students also select a Field of Practice Emphasis from one of three areas—Health/Mental Health; Families and Children; or Aging—to further deepen their expertise in interpersonal practice. f Graduates are employed in a range of human service settings, including youth and family agencies, child and adult protective services, schools, area mental health agencies, substance abuse centers, health care settings, and neighborhood service centers.

Additional Admission Requirements

Students begin in the Fall semester. In addition to the general requirements for admission to the graduate school, applicants for the M.S.W. program:

1) Must have a minimum grade point average of 3.0 for the last two years and 2.75 overall for their undergraduate work.
2) Acceptable scores on the GRE. The total quantitative and verbal scores should be in the range of 1000; previous accepted scores averaged 960. Marginal GRE scores may be offset by other exceptionally strong components of the application. Applications with total scores below 800 are considered marginal but would not omit the applicant from consideration.
3) Must present evidence of having a liberal arts foundation for MSW study. Courses in statistics and human biology are required. In addition, transcripts are evaluated for a liberal arts foundation with courses in the humanities, the social and behavioral sciences, and the physical sciences, for example.
4) Social work applicants are required to submit the Statement of Purpose Form included in the graduate application package, but this should be expanded to four or five pages in length to include the following:
   a) Your reasons for seeking graduate social work education at this time. If you are currently working in a social service job, explain your reasons for pursuing further formal education. If you are changing fields, discuss your reasons for doing so. Explain why you are making this change now.
   b) How your life experiences have led you to seek a graduate social work degree. How do you account for your interest in social work?
   c) Your personal strengths and limitations for the practice of social work.
   d) The particular aspects of social work that interest you most .
   e) What you see yourself doing professionally five years in the future?
   f) Diversity is a valued aspect of the social work program. How do you think you might enrich the class with your cultural experiences, unique skills, and interest?
   g) Your activities in social work organizations and any honors you have received.
   h) Your signature and date.
5) An attachment to the essay outlining the applicant's educational, work and volunteer experience, and special skills or attributes. The attachment should total no more than two pages and should be in resume format to include:
   Personal data: Name, address, phone number, email address
   Educational experience: Institutions and the dates you attended
      Your academic degrees awarded, include majors and minors
   Work experience: List all positions in chronological order (beginning with most recent) with a 2-3 line job description for each.
      Include all beginning and ending dates for each position.
      Identify if a MSW or a BSW level social worker supervised you.
      Indicate whether the position was full-time or part-time.
   Volunteer experience: List all positions in chronological order (beginning with most recent) with a 2-3 line job description for each.
      Include all beginning and ending dates for each position.
      Identify if an MSW or a BSW level social worker supervised you.
   Professional affiliations and honors from your school, profession, or community:

List any memberships in professional organizations and service groups
List any offices held in these organizations.
Add honors or special awards received.

6) Three Letters of Recommendation Forms. If you are a graduate within the past 5 years, at least two must be from faculty members. For applicants who have been out of the education system for some time, letters should be from someone who can comment on your suitability for graduate education. It is recommended that at least one reference be from a professional working in the applicant's field of interest.

Upon acceptance to the program, students will be asked to complete an Intent to Enroll form and a Field Application Form. Because some field placement agencies serving vulnerable populations exclude personnel with criminal convictions, students entering the program may be subject to a criminal history inquiry. Many agencies require drug testing as well.

Degree Requirements

Foundation Curriculum (first year):

SOWK6101 Human Behavior and the Social Environment I: Individuals, families, and small groups (3)
SOWK6111 Social Welfare Policy I: Historical and Policy Context of Social Work Practice (3)
SOWK6112 Social Welfare Policy II: Theory, Policy, and Analysis of Social Welfare Policy and Programs in the United States (3)
SOWK6121 Social Work Practice I: Theories and skills in practice with individuals, families, groups (3)
SOWK6131 Social Work Research I: Introduction to social science research methods (3)
SOWK6202 Human Behavior and the Social Environment II: Groups, organizations, communities (3)
SOWK6222 Social Work Practice II: Theories and skills in practice with groups and communities (3)
SOWK6232 Social Work Research II: Philosophies and methods of evaluating social work practice and programs (3)
SOWK6441 Practicum I: Application of foundation knowledge, values, and skills to practice setting (3)
SOWK6442 Practicum II: Application of foundation knowledge, values, and skills to practice setting (3)

Advanced Curriculum (second year):

SOWK7103 Human Behavior and the Social Environment III: Theories of mental illness, DSM- (3)
SOWK7123 Advanced Interpersonal Practice with Individuals: Evaluation and intervention methods (3)
SOWK7124 Advanced Interpersonal Practice with Families: Diversity among family systems, intervention models (3)
SOWK7125 Advanced Interpersonal Practice with Small Groups: Group development and facilitation methods (3)
SOWK7443 Practicum III: Application of advanced knowledge, values, and skills to practice setting ()4
SOWK7444 Practicum IV: Application of advanced knowledge, values, and skills to practice setting ()5
SOWK7651 Field of Practice Seminar: Study of theory and practice issues of student's specialty (3)
Two Field of Practice Electives selected according to the student's specialty (6)

Electives may be selected from the offerings of any department on campus, but must be approved by the student's advisor prior to registration.

The Field Placement

Field placements are assigned from a variety of agencies and practice settings approved by the UNC Charlotte Social Work Field Office. Field Instructors, approved by the Department, guide the student through learning experiences, coordinating field experiences with the concurrent classroom coursework. The first year of field placement focuses on foundation practice skills. The second year of placement, in a different setting, focuses on advanced practice within the student's Field of Practice Emphasis area.

State Certification

Graduates of the MSW Program are eligible to pursue North Carolina State Licensure/Certification at three levels: Licensed Clinical Social Worker, Certified Master Social Worker, and Certified Social Work Manager. Licensure/certification is managed by the North Carolina Certification Board for Social Work. The Board may be contacted at www.swboard.org or (800) 550-7009.

Financial Assistance

Paid internships and assistantships are limited. Contact the department for more information.

Courses in Social Work

SOWK 6101. Human Behavior and the Social Environment I. (3) Overview of theories related to human behavior with an emphasis on individuals and families, small groups, organizations and communities. Systems theories and theories related to disenfranchised groups including feminist theories are also integrated throughout the course. *(Fall)*

SOWK 6111. Social Welfare Policy I: Historical and Policy Context of Social Work Practice. (3) The development of social work practice theories is presented in the context of the historical evolution of society and specifically social policy. The interaction between social work's professional aspirations, public and private social welfare policy, and the development of practice theories is emphasized. Particular attention is paid to the current trend toward privatization of social welfare services and the effect this is having on social work practice and social workers' career paths and prospects. *(Fall)*

SOWK 6112. Social Welfare Policy II: Theory, Philosophy and Analysis of Social Welfare Policy and Programs in the United States. (3) Prerequisite: SOWK 6111, Social Welfare Policy I; SOWK 6121, Social Work Practice I. This course focuses on the policy making process, policy analysis and implications of policy for program design and service delivery. The course will provide an overview of current policies guiding social work practice in major areas of social welfare service delivery. *(Spring)*

SOWK 6121. Social Work Practice I: Individuals, Families, & Groups. (3) The first course in a two-course foundation practice sequence. Introduces foundation skills and theories of culturally competent social work practice with individuals, families, and groups. Develops the ecological systems perspective of practice with an emphasis on client strengths and problem-solving processes within a context of adherence to social work values and ethics. *(Fall)*

SOWK 6131. Social Work Research I. (3) Prerequisite: An upper division introductory statistics course. First of two courses in the research foundation curriculum. Introduction to social science research methods and their relevance to social work. Preparation to critically read research studies and produce applied research expected in social agencies. *(Fall)*

SOWK 6202. Human Behavior and the Social Environment II. (3) Prerequisite: SOWK 6101, Human Behavior and the Social Environment I. Overview of theories related to human behavior with an emphasis on various theories of small groups, organizations and communities. System theories, social construction theories, and theories related to disenfranchised groups such as feminist theories and non-western, non-English speaking systems of thought are also integrated throughout the course. *(Spring)*

SOWK 6222. Social Work Practice II: Organizations and Communities. (3) Prerequisite: SOWK 6121, Social Work Practice I. The second course in the foundation practice sequence. Introduces foundation skills and theories of culturally competent social work practice with organizations and communities. Areas of focus include leadership development in nonprofit organizations and collaborative approaches to building and strengthening neighborhoods. *(Spring)*

SOWK 6232. Social Work Research II: Practice and Program Evaluation. (3) Prerequisite: SOWK 6131, Social Work Research I. The second course in the foundation research sequence. Introduction to a range of philosophies, methods, and activities involved in evaluation of professional social work practice and of social service programs. Both quantitative and qualitative approaches are explored. *(Spring)*

SOWK 6441. Social Work Practicum I. (3) Prerequisite or Corequisite: SOWK 6121, Social Work Practice I; SOWK 6101, Human Behavior and the Social Environment I. The foundation field practicum prepares students to apply generalist social work knowledge, skills, values, and ethical principles gained in the classroom to actual practice at a social agency. Students work in an approved field site under the supervision of a UNC Charlotte field instructor. *(Fall)*

SOWK 6442. Social Work Practicum II. (3) Continuation of SOWK 6441, Social Work Practicum I & Seminar. *(Spring)*

SOWK 6895. Directed Independent Study. (1-6) Prerequisite: Permission of the department and instructor to be obtained in the semester preceding the semester in which the course is to be taken. Guided individual study in topics related to Social Work that are not offered in the MSW curriculum or available through elective courses in other graduate programs at UNC Charlotte. *(Fall, Spring, Summer)*

SOWK 7090. Special Topics in Social Work. (3) A topics course that is only available for graduate credit. *(On demand)*

SOWK 7103. Human Behavior and the Social Environment III. (3) Prerequisite: SOWK 6202, Human Behavior and the Social Environment II. Overview of theories related to mental health and mental illness. Content on the responsible use of the Diagnostic and Statistical Manual of the American Psychiatric Association. Social Construction theories and theories related to deviance and social control will be emphasized. *(Fall)*

SOWK 7123. Advanced Interpersonal Practice with Individuals. (3) Prerequisite: SOWK 6222, Social Work Practice II. As a part of a three- course advanced practice sequence the focus if this course is on multi-theoretical and multi-method approaches for advanced interpersonal practice with individuals. Emphasis is on in-depth assessment, intervention, and evaluation of services with attention to time-limited and empirically supported methodologies. *(Fall)*

SOWK 7124. Advanced Interpersonal Practice with Families. (3) Prerequisite: Social Work 6222, Social Work Practice II. As a part of a three course advanced practice sequence the focus of this course is on multi-theoretical and multi-method approaches for advanced interpersonal practice with families. Diversity among family systems and time-limited intervention models for social work practice with families are emphasized. *(Spring)*

SOWK 7125. Advanced Social Work Practice with Groups. (3) Prerequisite: SOWK 6222, Social Work Practice II. As a part of a three course advanced practice sequence the focus of this course is on multi-theoretical and multi-method approaches for advanced interpersonal practice with small groups. Emphasis is on various approaches to group development and facilitation including social change, therapeutic factors, leadership, composition, contracting, goal setting, and evaluation. *(Fall)*

SOWK 7443. Social Work Practicum III. (6) 4Prerequisite: SOWK 6442, Social Work Practicum II. Corequisite: Enrollment in at least one advanced social work practice class (SOWK 7123, SOWK 7124, or SOWK 7125). Students work in an approved social service agency developing specialized social work skills in their area of focus. Students are expected to demonstrate advanced social work practice skills that indicate an integration of theories, research, and policies in relation to their area of specialization within interpersonal practice. *(Fall)*

SOWK 7444. Social Work Practicum IV. (3) Prerequisite: SOWK 7443, Social Work Practicum III. Corequisite: Enrollment in at least one advanced social work practice class (SOWK 7123, SOWK 7124, or SOWK 7125). Continuation of SOWK 7443, Social Work Practicum III. *(Spring)*

SOWK 7651. Field of Practice Seminar. (3) Prerequisite: Student must be in the last semester of the M.S.W. curriculum. This is a capstone course in which the student prepares a comprehensive paper describing the major historical and current theories, philosophies, and research issues of social work practice, policy, and human behavior in the social environment, related to the field of practice in which the student has indicated a specialization. The student will be expected to present sections of the paper at least twice during the semester. *(Spring)*

SOWK 7627. Seminar in Advanced Practice: Supervision and Staff Training. (3) Prerequisite: Student must be in the last semester of the M.S.W. curriculum. Students may choose to satisfy their social work elective requirement with this course. This seminar is for students who anticipate working in traditional social welfare organizations in the public or private sectors. The focus of this seminar is on knowledge and skills that a social worker will need to succeed in practice in large organizations. Included is content on supervision, staff training and development, and the role of the professional in large organizations. *(Spring)*

SOWK 7999. Masters Degree Graduate Residence. (1) *(Fall, Spring, Summer)*

College of Information Technology

The College of Information Technology at the University of North Carolina at Charlotte is the only school of its kind in the Carolinas. Its mission is an important one – to prepare the information technology professionals of tomorrow through cutting-edge research, education, and partnerships with the community. Students help shape the future by participating in educational programs that respond directly to the needs of government and business. The College of Information Technology is designated as a National Center of Academic Excellence in Information Assurance Education by the National Security Agency. The world of information technology changes rapidly, and the UNC Charlotte College of IT advances the field with its combination of the latest science, industry expertise, and dedicated faculty and students. Hard at work on a full spectrum of research topics, the College of IT has broken new ground in computer science, computer engineering, information systems, and information technology applications.

Areas of interest to College of IT researchers include 3D HCI, Access Control, Authentication and Identification, Bioinformatics, Biomedical Imaging and Instrumentation, Biomedical Signal Processing, Case-Based Reasoning, Communication Networks, Complex Adaptive Systems, Computer and Parallel Architecture, Computer Assisted Collaborative Work, Computer Graphics, Computer Integrated Manufacturing, Computer System Engineering, Computer Vision, Context-Aware Software Design, Cryptography and Applications, Data Mining, Enterprise Security, Enterprising Integration, Evolutionary Computation, Flexible Query Processing, Foundations of Security, Future Proof Security Systems, Haptics, Heuristic Search, Human Computer Interaction, Image/Video Processing, Information Environments, Information Security and Assurance, Information System Personalization, Insider Threat Prevention and Detection, Intelligent Systems, Intrusion Prevention and Detection, Knowledge Based Systems, Knowledge Discovery, Modeling and Simulation of Information Infrastructure, Modeling for Computer Security, Multi-Agent Systems, Multimedia Databases, Network and Distributed Systems Security, Neural Systems, Neural Networks, Ontological Engineering, Pervasive Security, Privacy Preserving Technology, Provably Secure Systems, Robotics, Scientific and Information Visualization, Secure Electronic Commerce, Secure Information Systems, Secure Peer-to-Peer Computing, Secure Software Engineering, Security Protocols, Semantically Rich Information Systems, Signcryption, Soft Computing, Software Design Patterns and Architectures, Software Design Verification and Validation, Software Process Improvement, Software Requirements Engineering, Software Testing, Survivable Security Systems, Virtual Reality, Vision, Web Security, Wireless Networks, and Wireless Security.

Graduate Degree Programs
Master of Science in Computer Science
Master of Science in Information Technology
Ph.D. in Information Technology

Graduate Non-Degree Programs
Certificate in Advanced Databases and Knowledge Discovery
Certificate in Information Security and Privacy
Certificate in Information Technology Management

COMPUTER SCIENCE

Computer Science
STECH 421A
704-687-6374
http://www.cs.uncc.edu

Degree
M.S.

Program Director
Dr. Keh-Hsun Chen

Graduate Faculty
Tiffany Barnes, Assistant Professor
Keh-Hsun Chen, Professor
Teresa Dahlberg, Associate Professor
Jianping Fan, Assistant Professor
Larry Hodges, Professor
Lawrence Mays, Professor
Zbigniew Michalewicz, Professor
Taghi Mostafavi, Associate Professor
Kayvan Najarian, Assistant Professor
Zbigniew Ras, Professor
William Ribarsky, BoA Endowed Professor
Min Shin, Assistant Professor
K.R. Subramanian, Associate Professor
Yu Wang, Assistant Professor
Zachary Wartell, Visiting Assistant Professor
Barry Wilkinson, Professor
Xintao Wu, Assistant Professor
Jing Xiao, Professor

Adjuncts
Lech Banachowski, Professor
Alicja Wieczorkowska, Assistant Professor

MASTER OF SCIENCE IN COMPUTER SCIENCE

The objective of the computer science Master of Science program is to provide students advanced skills and knowledge in planning, design, implementation, testing, and management of computer systems and applications. These skills form a good foundation for doctoral study, research, or teaching in computer science. These abilities are needed for those individuals holding related technical or managerial positions, as they provide the expertise to solve computer system problems in government, business, and industry.

The active research areas in the Department of Computer Science include 3D HCI, Bioinformatics, Biomedical Imaging and Instrumentation, Biomedical Signal Processing, Communication Networks, Computer and Parallel Architecture, Computer Graphics, Computer System Engineering, Computer Vision, Data Mining, Evolutionary Computation, Flexible Query Processing, Haptics, Heuristic Search, Image/Video Processing, Intelligent Systems, Knowledge Based Systems, Knowledge Discovery, Multimedia Databases, Neural Systems, Neural Networks, Robotics, Scientific and Information Visualization, Soft Computing, Virtual Reality, Vision, Cluster Computing, and Wireless Networks.

Additional Admission Requirements

In addition to the general requirements for admission to the graduate school, students applying for this program are expected to have knowledge of two higher languages, data structures, algorithm analysis, computer organization and architecture, and two additional senior level computer science courses in systems and/or applications. Also, knowledge of calculus, discrete mathematics, and linear algebra are required. Students without all the above undergraduate prerequisites in computer science and mathematics may need additional coursework after entering the program, as determined by the Department.

A bachelor's degree in a high quality computer science program or satisfactory completion of the Advanced GRE in Computer Science may be substituted for some or all of the subject area admission requirements. Individuals who have worked at a high professional level in the computer industry may be able to substitute work experience for some of the specific subject area requirements, subject to review by the Department Graduate Committee.

Students must have an undergraduate grade point average of (or equivalent to) at least 2.8 (on a 4.0 point scale) and a junior/senior GPA of at least 3.0. A satisfactory score on the aptitude portion of the GRE is also required.

Early-Entry Program

Exceptional undergraduate students at UNC Charlotte may be accepted into the Master of Science in Computer Science and begin work toward a graduate degree before completion of the baccalaureate degree. The criteria for admission are the following:

1) A student may be accepted into the Early-Entry Program at any time after completion of 75 semester hours of undergraduate work applicable to the appropriate degree, although it is expected that close to 90 hours will have been earned by the time the first graduate course is taken.
2) The application process and all required documentation (e.g., test scores, transcripts, letters of recommendation) are the same for early entry students as for other applicants to the program. Admission must be recommended by the Department of Computer Science and approved by the Graduate School. The admission status will be "provisional" pending the award of the undergraduate degree.
3) To be accepted into this program an undergraduate student must have at least a 3.2 overall GPA and a minimum 3.3 GPA in the Department of Computer Science.
4) If an early-entry student has not met the normal admission requirements of a 2.8 overall undergraduate GPA and a 3.0 junior-senior GPA at the end of his/her baccalaureate degree, she/he will be dismissed from the graduate program.
5) Students accepted into an early-entry program will be subject to the same policies that pertain to other matriculated graduate students. Generally, it will be assumed that early-entry students will finish their baccalaureate degrees before they complete 15 hours of graduate work.
6) This early-entry program is also accelerated in which up to 12 hours earned at the graduate level may be substituted for required undergraduate hours. In other words, up to 12 hours of graduate work may be "double counted" toward both the baccalaureate and graduate degrees.

Degree Requirements

The Master of Science program in Computer Science requires 30 graduate credit hours, which may optionally include 6 hours of thesis. At least 15 hours must be ITCS or ITIS courses at the 6000 level or above. A maximum of 6 hours of graduate credit may be transferred from other institutions.

Core Subjects and Breadth

Each student must demonstrate knowledge in the following three core subjects listed below. A student can satisfy the requirement of a core subject by having a prior undergraduate course on the subject, or completing the ITCS undergraduate course (which carries no graduate credit hours), or completing a related graduate course.

1) Programming Languages (ITCS 3102 or equivalent) or related graduate course: ITCS 5102
2) Algorithm Analysis (ITCS 2215 or equivalent) or related graduate course: ITCS 6114
3) Computer Architecture (ITCS 3182 or equivalent) or related graduate course: ITCS 5141

All of the above three core subjects must be completed before the end of the first year.

In addition, to ensure breadth, each student must demonstrate knowledge in at least two of the following four subjects listed below before graduation. A student can satisfy the breadth requirement on a subject by having a prior undergraduate course on the subject, or completing the ITCS undergraduate course (which carries no graduate credit hours), or completing a related graduate course.

1) Operating Systems (ITCS 3143 or equivalent) or related graduate course: ITCS 6144
2) Software Engineering (ITCS 3155 or equivalent) or related graduate course: ITCS 6112
3) Data Bases (ITCS 3160 or equivalent) or related graduate course: ITCS 6160
4) Communications and Networks (ITCS 3166 or equivalent) or related graduate course: ITCS 6166

Systems Course

Each student must complete at least one systems course:

ITCS5141	Computer Organization and Architecture
ITCS6112	Software System Design and Implementation
ITCS6144	Operating System Design
ITCS6148	Advanced Object Oriented Systems
ITCS6160	Database Systems
ITCS6166	Computer Communication and Networks
ITCS6182	Advanced Computer Architecture

Theory Course

Each student must complete at least one theory course:

ITCS5110	Programming Languages and Compilers
ITCS5165	Coding and Information Theory
ITCS5170	Formal Languages and Automata
ITCS6114	Algorithms and Data Structures
ITCS6115	Adv. Topics in Algorithms and Data Structures
ITCS6170	Logic for Artificial Intelligence
ITCS6175	Computability and Complexity

Areas of Concentration

Each student must take at least three related courses (9 hours) to form an area of concentration. The three courses forming the student's area of concentration must have the written approval of the student's academic advisor. Students are encouraged to have their areas of concentration aligned with the faculty research areas.

Assistantships

Financial assistance for qualified students is available on a competitive basis in the form of graduate teaching and research assistantships. Students that are awarded assistantships are expected to choose the thesis option. The deadline for graduate teaching assistantship applications is February 15 for the following academic year. For detailed and updated information, refer to the Computer Science Website.

Minor in Operations Research

The Department of Computer Science participates in the program leading to an interdisciplinary graduate minor in Operations Research. See Operations Research Section of this Catalog for complete information and program requirements.

CERTIFICATE IN ADVANCED DATABASES AND KNOWLEDGE DISCOVERY

Program Director

Dr. Zbigniew Ras

Program of Study

The purpose of this certificate is to provide graduate students with the opportunity to reach a demonstrated level of competence in the areas of databases and knowledge discovery. Course-work towards this graduate certificate can be used for credit towards the MS degree in Computer Science. However, its primary objective is to provide a well-defined target for students who want to advance their knowledge of modern databases and knowledge discovery techniques, but do not necessarily wish to complete all requirements for the M.S. degree in Computer Science. The certificate may be pursued concurrently with any of the graduate degree programs at UNC Charlotte.

Additional Admission Requirements

This certificate program is open to all students who hold a BS degree in any scientific, engineering, or business discipline and either:

1) are enrolled and in good standing in a graduate degree program at UNC Charlotte, or
2) have GPA above 2.8 overall and 3.0 Jr/Sr.

Applicants are required to submit a brief (one-to-two page) statement of educational and work experience in the computing field. Application for the ADKD certificate program is made through the Office of Graduate Admissions.

Completion Requirements

The certificate will be awarded upon completion of five graduate level courses (15 credits) in the area of knowledge discovery and databases. A cumulative GPA

of 3.0 will be required and at most one course with a grade of C may be allowed towards the certificate.

To obtain the certificate a student needs to take: ITCS 6150 or ITCS 6114; ITCS 6160; ITCS 6162; and two additional courses.

For detailed and updated information refer to the Computer Science Website.

Courses In Computer Science

ITCS 5102. Survey of Programming Languages. (3) Prerequisite: consent of the Department. Study of the concepts underlying various computer languages, and comparing and evaluating various language features. History and development of various languages, such as FORTRAN, ALGOL, PASCAL, MODULA-2, C, C++, Ada, Lisp, Smalltalk, Prolog.; evaluation and comparison of various algorithms and language suitability. Selection of languages for problems/environments. Overview of various languages. *(On demand)*

ITCS 5120. Introduction to Computer Graphics. (3) Prerequisites: ITCS 2214 and MATH 2164 or consent of Department. Graphics hardware; raster algorithms; geometric transformations; 2D/3D interactive graphics; 3D viewing and perspective projections; color and lighting models; hidden surface removal; modeling hierarchies; fractals; curved surfaces. *(Spring; Fall) (Evenings)*

ITCS 5128. Programming Languages and Compilers. (3) Prerequisite: consent of the Department. Introduction to the concepts and techniques used in describing, defining, and implementing programming languages and their compilers. Introduction to parsing and parser construction; LL and LR grammars; syntax directed translation; data object representations; run time structures; intermediate languages; code optimization. *(On demand)*

ITCS 5141. Computer Organization and Architecture. (3) Prerequisite: ITCS 3182 or equivalent. Fundamentals of computer design; instruction set design, basic processor implementation techniques; pipelining; memory hierarchy; input/output. Cost/performance and hardware/software trade-offs. *(Even, Fall/ Spring) (Evenings)*

ITCS 5145. Parallel Computing. (3) Prerequisites: ITCS 1215 and 3182 or consent of Department. Types of parallel computers, programming techniques for multiprocessor and multicomputer systems, parallel strategies, algorithms, and languages. *(On demand)*

ITCS 5151. Intelligent Robotics. (3) Prerequisites: ITCS 1215 and MATH 2164, or consent of the Department. General introduction to spatial descriptions and transformations, and manipulator position and motion. More study on robot planning, programming, sensing, vision, and CAD/CAM. *(Odd, Spring) (Evenings)*

ITCS 5152. Computer Vision. (3) Prerequisites: ITCS 1215 or MATH 2164, or consent of the Department. General introduction to Computer Vision and its application. Topics include low-level vision, 2D and 3D segmentation, 2D description, 2D recognition, 3D description and model-based recognition, and interpretation. *(Odd, Spring) (Evenings)*

ITCS 5157. Computer-Aided Instruction. (3) Prerequisite: consent of the Department. History of CAI; study of current CAI systems; development of man-machine dialogue; programming tools for CAI; information structures for computer-oriented learning. Advantages/disadvantages/ costs of CAI. *(On demand)*

ITCS 5181. Microcomputer Interfacing. (3) Prerequisite: ITCS 3182 or equivalent, or permission of the Department. Signal conditioning, A/D conversion, noise, transmission line effects, signal processing, D/A conversion and serial/parallel interfaces. *(On demand)*

ITCS 6010. Topics in Computer Science. (3) Prerequisite: consent of the Department. Topics in computer science selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 6050. Topics in Intelligent Systems. (3) Prerequisite: consent of the Department. Topics in intelligent systems selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 6080. Topics in Computer Engineering. (3) Prerequisite: consent of the Department. Topics in computer engineering selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 6107. Formal Languages and Automata. (3) Prerequisites: one semester of discrete structures or consent of the Department. Detailed study of abstract models for the syntax of programming languages and information processing devices. Languages and their representation; grammars; finite automata and regular sets; context-free grammars and pushdown automata; Chomsky Hierarchy; closure properties of families of languages; syntax analysis. *(On demand)*

ITCS 6110. Topics in Programming Languages and Compilers. (3) A continuation of material in ITCS 5128 with emphasis on advanced aspects of optimization, data flow analysis, and error discovery. *(On demand)*

ITCS 6111. Evolutionary Computation. (3) Prerequisite: ITCS 6114 or consent of the Department.

General introduction to optimization problems. Optimization techniques: hill climbing, simulated annealing, evolution strategies, and genetic algorithms. Evolution programming techniques. *(Even, Spring) (Evenings)*

ITCS 6112. Software System Design and Implementation. (3) Prerequisite: consent of the Department. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on human interface aspects of systems. Planning software projects; software design process; top-down design; modular and structured design; management of software projects; testing of software; software documentation; choosing a language for a software system. This course is cross-listed with ITIS 6112 *(Fall, Spring) (Evenings)*

ITCS 6114. Algorithms and Data Structures. (3) Prerequisite: full graduate standing. Introduction to techniques and structures used and useful in design of sophisticated software systems. Records; arrays; linked lists; queues; stacks; trees; graphs; storage management and garbage collection; recursive algorithms; searching and sorting; graph algorithms; time and space complexity. *(Fall, Spring) (Evenings)*

ITCS 6115. Advanced Topics in Algorithms and Data Structures. (3) Prerequisite: ITCS 6114. Continuation and extension of ITCS 6114. String matching; semi numerical algorithms; probabilistic algorithms; parallel algorithms; NP-completeness; computationally hard problems; approximation algorithms. *(On demand)*

ITCS 6120. Computer Graphics. (3) Prerequisites: full graduate standing or consent of the Department. Introduction to the design and implementation of interactive graphics systems. Raster and vector display systems, I/O devices; graphics primitives and their attributes; raster algorithms and clipping; 2D/3D geometric transformations; 3D viewing and projections; hierarchical and procedural models; surface representation; color and lighting models; rendering algorithms; global illumination and texture mapping. *(Fall) (Evenings)*

ITCS 6226. Bioinformatics. (3) Prerequisites: Graduate standing. Topics include: brief review of molecular biology, proteins and their classifications, DNA, RNA, and using microarrays and gene chips for sequencing; review of computational techniques for bioinformatics, expectation maximization, Bayesian classifiers, dynamic programming, information theory and entropy analysis, Markov chain models, and neural networks; computational techniques for local and multiple sequence alignment; application of Markov chains in finding genes; using information theory to estimate binding sites, start Codon prediction; RNA secondary structure prediction; computational techniques for protein function prediction; advanced signal processing techniques in feature extraction from protein sequences. *(On demand) (Evenings)*

ITCS 6130. Advanced Computer Graphics. (3) Prerequisite: ITCS 6120 or equivalent, or consent of the Department. Implicit and parametric representation; cubic surfaces; advanced reflection models; global illumination models - ray tracing, radiosity; shadow algorithms, texture mapping; volumetric modeling and rendering techniques; animation; advanced modeling techniques; particle systems, fractals. *(On demand)*

ITCS 6132. Modeling and Analysis of Communication Networks. (3) Prerequisite: A course in communication networks or consent of the Department. The objective of this course is to develop an understanding of modeling and analysis techniques for communication systems and networks. The intent is to enable the student to understand how to comparatively analyze the cost and performance impact of network architecture and protocol design decisions. Modeling techniques for analytical analysis, simulation based analysis, and measurement based analysis will be presented. Concepts covered include validation/verification of models, workload characterization, metric selection, presentation and interpretation of results. A semester long analysis project will be undertaken. *(On demand)*

ITCS 6134. Digital Image Processing. (3) Prerequisite: full graduate standing or consent of the Department. Cross-listed as ECGR 6118. Image perception; image types/applications; image restoration and enhancement; edge/boundary detection; image transformation; image segmentation; statistical and syntactical pattern recognition; image information measures and compression. *(Even, Spring) (Evenings)*

ITCS 6140. Data Visualization. (3) Prerequisite: Full graduate standing or consent of the Department. Emphasis on the methodology and application of data visualization to scientific and engineering data; data types and models; visualization methods; volume visualization; scalar, vector and tensor fields; multi-variate visualization; visualization systems and models; visualization applications; visualization software and hardware; research issues; and future trends. *(Odd, Spring) (Evenings)*

ITCS 6144. Operating Systems Design. (3) Prerequisite: ITCS 6114 or consent of the Department. Introduction to features of a large-scale operating system with emphasis on resource-sharing environments. Computer system organization; resource management; multiprogramming; multi-processing; file systems; virtual machine concepts; protection and efficiency. *(Even, Spring) (Evenings)*

ITCS 6148. Advanced Object-Oriented Systems. (3) Prerequisites: ITCS 6112 or equivalent. This course focuses on issues related to the design, implementation,

integration, and management of large object-oriented systems. Topics include: object models, object modeling, frameworks, persistent and distributed objects, and object-oriented databases. This course is cross-listed with ITIS 6148 *(Spring) (Alternate Years) (Evenings)*

ITCS 6490. Industrial Internship. (1-6) Prerequisite: Completion of six hours of graduate coursework. Full or part-time academic year internship in computer science areas complementary to the concentration area of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised in industrial experience. Each student's internship program must be approved by the supervising faculty, the academic advisor, and the graduate program director. A mid-term report and final report to be evaluated by the supervising faculty are required. May be repeated for credit hours but the credit hours may not be part of the minimum 30 credit hours for graduation. *(on demand)*

ITCS 6150. Intelligent Systems. (3) Prerequisites: full graduate standing or consent of the Department. To introduce core ideas in AI. Heuristic versus algorithmic methods; problem solving; game playing and decision making; automatic theorem proving; pattern recognition; adaptive learning; projects to illustrate theoretical concepts. *(Fall) (Evenings)*

ITCS 6153. Neural Networks. (3) Prerequisites: ITCS 6114. Topics include: basic notions and models of artificial neural nets; single layer neural classifiers; multilayer one-way neural nets; single layer feedback networks; neural models of associative memory; self organizing neural nets; translation between neural networks and knowledge bases; applications of neural networks. *(Even, Fall) (Evenings)*

ITCS 6154. Heuristic Search. (3) Prerequisite: ITCS 6150. Heuristics and problem representation; heuristic-search procedures; formal properties and performance analysis of heuristic methods; game-searching strategies and heuristic programming; search with probabilities; knowledge-guided search. *(On demand)*

ITCS 6155. Knowledge-Based Systems. (3) Prerequisite: ITCS 6162 or consent of the Department. Knowledge systems; knowledge discovery; association rules; query languages and operational semantics; decision systems; cooperative and collaborative systems; tree structured information systems; tree structured query languages; flexible query answering; chase algorithm based on rules; local and global ontologies; action rules; optimization problems for query answering systems. *(Even, Spring) (Evenings)*

ITCS 6156. Machine Learning. (3) Prerequisite: ITCS 6150 or consent of the Department. Machine learning methods and techniques including: acquisition of declarative knowledge; organization of knowledge into new, more effective representations; development of new skills through instruction and practice; and discovery of new facts and theories through observation and experimentation. *(On demand)*

ITCS 6157. Visual Databases. (3) Prerequisites: ITCS6160 or equivalent. Topics include: representation of visual content, querying visual databases, content-based interactive browsing and navigation, system architecture, similarity models, indexing visual databases, data models and knowledge structures, image retrieval by similarity, and video retrieval by content. *(Even, Fall) (Evenings)*

ITCS 6158. Natural Language Processing. (3) Prerequisite: ITCS 6150. Principles, methodologies, and programming methods of natural language processing including foundations of natural language understanding, namely: lexical, syntactic, and semantic analysis, discourse integration, and pragmatic and morphological analysis. *(On demand)*

ITCS 6160. Database Systems. (3) Prerequisite: ITCS 6114 or consent of the Department. Introduction to principles of database design, and survey of alternative database organizations and structures. Logical database organization; schemas; subschemas; data description languages; hierarchical, network, and relational databases; database management systems; normal forms. *(Fall, Spring) (Evenings)*

ITCS 6161. Advanced Topics in Database Systems (3) Prerequisite: ITCS 6160 or equivalent. Continuation of ITCS 6160. Topics include deductive databases; semantic query processing; intelligent and cooperative query languages; distributed databases; active databases; heterogeneous databases, multimedia databases; data and knowledge interchange; multidatabase systems; very large databases. *(Odd, Spring) (Evenings)*

ITCS 6162. Knowledge Discovery in Databases. (3) Prerequisite: ITCS 6160 or consent of the Department. The entire knowledge discovery process is covered in this course. Topics include: setting up a problem, data preprocessing and warehousing, data mining in search for knowledge, knowledge evaluation, visualization and application in decision making. A broad range of systems, such as OLAP, LERS, DatalogicR+, C4.5, AQ15, Forty-Niner, CN2, QRAS, and discretization algorithms are covered. *(Fall) (Evenings)*

ITCS 6163. Data Warehousing. (3) Prerequisite: ITCS 6160 or equivalent. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL queries; the warehouse data models: multidimensional, star, snowflake; architecture of a data warehouse and the process of warehouse construction; data consolidation from various sources; optimization; techniques for data transformation and knowledge extraction; relations with enterprise modeling. *(Odd, Spring) (Evenings)*

ITCS 6164. Design and Implementation of On-line Management Information Systems. (3) Prerequisites: ITCS 6114 or consent of the Department. The fundamental concepts and philosophy of planning and implementing an on-line computer system. Characteristics of on-line systems; hardware requirements; modeling of on-line systems; performance measurement; language choice for on-line systems; organization techniques, security requirements; resource allocation. *(On demand)*

ITCS 6165. Coding and Information Theory. (3) Prerequisite: knowledge of probability theory. Information theory; coding theory; Shannon's theorem; Markov process; channel capacity; data transmission codes; error correcting codes; data compression; data encryption. *(Odd, Fall) (Evenings)*

ITCS 6166. Computer Communications and Networks. (3) Introduction to the concepts of communication networks; types of networks; wired and wireless media; communication architectures; network protocols; coding and modulation; multiplexing and multiple access; error and flow control; routing; Internet protocols; transport protocols; assignments include implementation and analysis of network protocols *(Fall) (Evenings).*

ITCS 6170. Logic for Artificial Intelligence. (3) Prerequisite: ITCS 6150 or consent of the Department. Introduction to basic concepts of logic for artificial intelligence, including declarative knowledge, inference, resolution, non-monotonic reasoning, induction, reasoning with uncertain beliefs, distributed information systems, intelligent information systems, planning and intelligent-agent architecture. *(On demand)*

ITCS 6171. Logic Programming. (3) Prerequisite: ITCS 6150 or consent of the Department. Prolog programming language; programming techniques in Prolog; foundations of logic programming including computability of Horn clause logic, completeness of resolution principle, complexity of unification algorithms, and verification of logic programs; principles of implementing logic programming systems; selected topics from applications of logic programming to expert systems, intelligent database systems, and/or natural language processing. *(On demand)*

ITCS 6175. Computability and Complexity. (3) Prerequisite: consent of the Department. Study of computability, unsolvability, computational complexity. Concept of effective computability; recursive functions; mathematical models of computation; universal Turing machines; unsolvable problems; time and space complexity of computations; NP-completeness problems; sub-recursive hierarchies. *(On demand)*

ITCS 6181. Switching and Automata Theory. (3) Prerequisite: consent of the Department. Topics include sets, relations, lattices, Boolean algebras; functional decomposition and symmetric functions; threshold logic; multiple-valued logic; fault detection and fault tolerant design; finite state machines, incompletely specified machines, minimization; state identification and fault detection experiments; finite state recognizers. *(On demand)*

ITCS 6182. Advanced Computer Architecture. (3) Prerequisite: ITCS 5141. Survey of existing and proposed architectures; pipelined, dataflow, restructurable, and supercomputer architectures. Multicomputer and multiprocessor architectures. Impact of VLSI on architecture. *(Odd, Fall) (Evenings)*

ITCS 6183. Computer Arithmetic. (3) Prerequisite: consent of the Department. Principles, architecture, and design of fast two operand adders; multioperand adders, standard multipliers, and dividers. Cellular array multipliers and dividers. Floating point processes, BCD, and excess three adders, multipliers, and dividers. *(On demand)*

ITCS 6184. Fault Tolerant Digital Systems. (3) Prerequisite: ITCS 5141. Design and analysis of fault tolerant digital systems including design techniques, qualitative and quantitative methods of evaluation, and available fault tolerant digital systems. *(On demand)*

ITCS 6186. Application Specifics System Design and Simulation. (3) Prerequisite: ITCS 5141 or equivalent or consent of the Department. Project oriented course on techniques and methodology in design and development of special purpose systems valuable for business, healthcare, and industrial community; course content includes system specifications, interface structure and data communication, interconnection architecture, and techniques for testing and debugging. *(Fall) (Even years)*

ITCS 6220. Pattern Recognition. (3) Prerequisites: Graduate standing. Topics include: pattern pre-processing and feature extraction (entropy minimization, orthogonal expansion, Fourier expansion, Karhunen-Loeve expansion, PCA); linear decision functions; orthogonal and non-orthogonal systems of functions; pattern classification by distance functions (Nearest Neighbor, K-means, ISODATA); pattern classification by likelihood functions (Bayesian classifiers, estimation of probability density function); trainable classifiers (LMSE, Perceptron, multi-layer perceptrons, fuzzy classifiers); stochastic processes; classification on categorical attributes. *(Odd, Fall) (Evenings)*

ITCS 6222. Biomedical Signal Processing. (3) Prerequisites: Graduate standing. Topics include: fundamental techniques in processing, analysis, feature extraction, and classification of complex signals; origin and processing techniques for biomedical signals, including ECG, ENG, EEG, MEG, ERG, EMG, respiratory signals, blood sound, and pressure signals. *(On demand)*

ITCS 6224. Biomedical Image Processing. (3) Prerequisites: Graduate standing, and Math 2164 or its equivalent. Topics include: review of image processing and pattern recognition (2-D Fourier transforms, 2-D Wavelet transform, denoising of medical images); origin and processing of X-ray images; CT images; MRI images; ultrasonic images; PET images; thermal images; electrical impedance images; cross-registration between images of different source; stereotactic neurosurgery; stereotactic radiosurgery/radiotherapy; robot-assisted surgery. *(Odd, Spring) (Evenings)*

ITCS 6226. Bioinformatics. (3) Prerequisites: Graduate standing. Topics include: brief review of molecular biology, proteins, and their classifications, DNA, RNA, and using microarrays and gene chips for sequencing; review of computational techniques for bioinformatics, expectation maximization, Bayesian classifiers, dynamic programming, information theory and entropy analysis, Markov chain models, and neural networks; computational techniques for local and multiple sequence alignment; application of Markov chains in finding genes; using information theory to estimate binding sites, start Codon prediction; RNA secondary structure prediction; computational techniques for protein function prediction; advanced signal processing techniques in feature extraction from protein sequences. *(On demand) (Evenings)*

ITCS 6265. Advanced Topics in Knowledge Discovery in Databases. (3) Continuation and extension of ITCS 6162. Information visualization in data mining and knowledge discovery, predictive data mining, mining of multimedia sources, mining of unstructured data, distributed data mining, mining of Web data/information, mining complex types of data, mining of biotechnology data, applications, and trends in data mining. *(On demand)*

ITCS 6267. Intelligent Information Retrieval. (3) Prerequisites: ITCS 6114 or consent of the Department. Topics include: definition of the information retrieval problem, modeling the information retrieval problem, evaluation of information retrieval, query languages and operations, text processing, indexing and searching, parallel and distributed information retrieval, user interface and visualization, multimedia information retrieval, and information retrieval applications. *(Even, Spring) (Evenings)*

ITCS 6690. Computer Science Seminar. (3) Prerequisites: at least 18 graduate ITCS/ITIS hours and consent of the Department. Experience for the advanced M.S. student on current problems of computer design and application. (May be used by a student or small group of students to work with a professor on a topic of mutual interest. May be used to give a course on a topic announced in advance.) *(On demand)*

ITCS 6880. Individual Study. (1-3) Prerequisites: At least 18 graduate ITCS/ITIS hours and consent of the department. With the direction of a faculty member, students plan and implement appropriate objectives and learning activities to develop specific areas of expertise through research, reading, and individual projects. May be repeated for credit. *(On demand)*

ITCS 6991. Computer Science Thesis. (1-3) Prerequisite: consent of the Department. Graduate thesis research. Detailed exploration of an area of computer science chosen for thesis research. May be repeated for credit but no more than six hours may be applied to M.S. degree requirements. *(Fall, Spring, Summer)*

ITCS 7999. Master's Degree Graduate Residence. (1) See Department for Course Description. *(Fall, Spring, Summer)*

INFORMATION TECHNOLOGY

College of Information Technology
STECH 443
704-687-6374
http://www.coit.uncc.edu

Degree
Ph.D.

Program Director
Dr. Keh-Hsun Chen

Graduate Faculty
Gail-Joon Ahn, Assistant Professor
Tiffany Barnes, Assistant Professor
Keh-Hsun Chen, Professor
Bei-Tseng Chu, Professor
W. Douglas Cooper, Professor
Teresa Dahlberg, Associate Professor
Abdullah Dasci, Assistant Professor
Jianping Fan, Assistant Professor
Mirsad Hadzikadic, Associate Professor
Larry Hodges, Professor
Hoon Kang, Assistant Professor
Moutaz Khouja, Professor
Ram Kumar, Associate Professor
Seok-Won Lee, Assistant Professor
Zhaoyu Liu, Assistant Professor
Lawrence Mays, Professor
Zbigniew Michalewicz, Professor
Taghi Mostafavi, Associate Professor
Kayvan Najarian, Assistant Professor
Sungjune Park, Assistant Professor
Baba Prasad, Assistant Professor
Anita Raja, Assistant Professor
Zbigniew Ras, Professor
William Ribarski, BoA Endowed Professor
Stephanie Robbins, Associate Professor
Cem Saydam, Professor
Min Shin, Assistant Professor
Mike Smith, Assistant Professor
Antonis Stylianou, Associate Professor
Chandrasekar Subramaniam, Assistant Professor
Kalpathi Subramanian, Associate Professor
William J. Tolone, Associate Professor
Yongge Wang, Assistant Professor
Yu Wang, Assistant Professor
Zachary Wartell, Visiting Assistant Professor
A. Barry Wilkinson, Professor
David Wilson, Assistant Professor
Susan Winter, Assistant Professor
Xintao Wu, Assistant Professor
Wei-Ning Xiang, Professor
Jing Xiao, Professor
Yuliang Zheng, Professor

Adjuncts
Ilieva Ageenko, Assistant Professor
Bruce Anderson, Assistant Professor
Lech Banachowski, Professor
Alicja Wieczorkowska, Assistant Professor

PH.D. IN INFORMATION TECHNOLOGY

The Ph.D. in Information Technology program is interdisciplinary and offers opportunities for students to develop advanced competencies in a number of IT related fields. It is a truly multidisciplinary program staffed with multidisciplinary faculty. Faculty from Computer Science (http://www.cs.uncc.edu), Software & Information Systems (http://www.sis.uncc.edu), and Business Information Systems & Operations Management (http://www.belkcollege.uncc.edu/iom) Departments form its core. Students, in cooperation with faculty advisors, design flexible programs of study tailored to address individual career goals.

Students who aspire to academic research and teaching can benefit from a strong research faculty of international stature and exposure to practical applications of their specialties. Others seeking employment in industry, commerce, or government are afforded the opportunity to participate in high-quality applied research.

Admission Requirements
Admission is competitive. Preference is given to applicants with strong credentials and appropriate academic and/or professional preparation. Specific admission requirements for the program include:

1) A baccalaureate degree.
2) Excellent GRE or GMAT scores.
3) Working knowledge of two high level programming languages at the level achieved by a one semester college course in each language.
4) Evidence of skills at the level of a college course in at least 3 of the following areas:
   a. Statistics,
   b. Differential and Integral Calculus,
   c. Discrete Math.,
   d. Linear Algebra.
5) Applicants whose native language is not English must score at least 557 (PBT) or 220 (CBT) in the Test of English as a Foreign Language (TOEFL). In addition, they will be required to take an English Proficiency Examination before beginning the first semester of study. Students who do not pass this examination must successfully complete ENGL 1100 (English as a Foreign Language) with a grade of B or higher.
6) A one-page essay that addresses the following:
   a. the applicant's motivation,
   b. area(s) of research interest, and

c. specifically how the programming language and coursework requirements are satisfied.

7) Three letters of reference from professionals working in the applicant's field of interest, at least two of which must be from faculty members.

Further documentation to support the application may include: evidence of scholarly and creative activity, including publication list; awards; results in national or international contests related to information technology, and the like. Only applications that are complete by the deadline will be considered.

Highly qualified individuals who do not meet all the prerequisites may be admitted with a clear agreement to complete them.

Application Deadlines

Application deadlines are in accordance with UNC Charlotte graduate school deadlines. However, to ensure full consideration for financial support, applications must be received by September 1st for spring admission and February 15 for fall admission.

Degree Requirements

To earn the Ph.D., students must complete at least 72 post baccalaureate credit hours. This will include at least 54 hours of course work beyond the bachelor's degree and 18 hours of dissertation research credit. A limited amount of transfer credit is allowed (see below for details). In general, courses taken in the College of IT, and many courses taken in a Business School are regarded as appropriate. It should be emphasized that the student's Ph.D. Advisory Committee will make the ultimate decision as to what courses the student must take to complete study at UNC Charlotte.

Students are expected to excel in all course work. Graduation requirements mandate that students must achieve a minimum grade point average of 3.0 to graduate. Receiving more than two C grades or a grade of U in any course will result in a suspension from the program. In this case, the student may not take any further graduate course work without being reinstated to the program. Reinstatement to the program requires approval of the Dean of the Graduate School on the recommendation of the Program Director. The dissertation is graded on a pass/fail basis and, therefore, will not be included in the overall assessment of cumulative average.

Requirements for Admission to Ph.D. Candidacy

1) Appointment of an Advisory Committee of at least four faculty members. The Advisory Committee must be approved by the Doctoral Committee for the Information Technology Doctoral Program (henceforth Doctoral Committee). In addition, the Graduate School will appoint a graduate faculty representative to the Advisory Committee.
2) Completion of the comprehensive examinations (see below).
3) Successful defense of the dissertation proposal.

Transfer Credit

In accordance with rules of the UNC Charlotte Graduate School, students are allowed to transfer up to 30 semester hours of graduate credit earned at UNC Charlotte or other recognized graduate programs. In cases of applicants with records of exceptionally high quality, the Doctoral Committee, at its discretion, may request that the Graduate School approve transfer credit beyond the limit set by the Graduate School.

To receive transfer credit, students must file a written request and submit all necessary documentation to the Program Director.

Comprehensive Examinations

IT Core Examination

All students must pass the core IT examination based on the Information Technology Core, which includes:

INFO8100 Research Methodologies (3)

One of the following:

ITCS8160 Database Systems (3)
INFO8201 Data and Knowledge Management in Business (3)

One of the following:

INFO8202 Business Information Systems: Analysis, Design, and Management (3)
ITCS8112 Software Systems Design and Implementation (3)

One of the following:

ITCS8150 Intelligent Systems (3)
ITCS8166 Computer Communications and Networks (3)
INFO8204 Business Data Communications (3)

The core examination is offered in fall and spring semesters. Students must submit Core Exam registration form to the Program Director during the first two weeks of the semester in which they wish to take the exam.

The core examination may be taken twice in different semesters. A student who fails the core exam twice will be terminated from the Ph.D. program.

Area examination

Each student must pass an area examination. The area examination will be based on a body of courses, consisting of at least two related courses, chosen by the student and approved by both the student's Advisory Committee and the Doctoral Committee.

Students must notify the Ph.D. coordinator in writing during the first two weeks of the semester in which they wish to take the exam. The notification must include the proposed set of courses the exam is to cover, and the faculty who have consented to draft the exam.

The area examination may be taken twice in different semesters. The second failure will result in termination of the student's enrollment in the Ph.D. program.

Ph.D. Candidacy

Each student must present and defend a Ph.D. dissertation proposal. The proposal defense will be conducted by the student's Advisory Committee and will be open to the Ph.D. IT faculty and students. At the discretion of Advisory Committee, the defense may include questions that cover the student's program of study and background knowledge in the area of the proposal.

A doctoral student advances to Ph.D. candidacy after the dissertation proposal has been successfully defended.

The second failed defense of a dissertation proposal will result in termination of the student's enrollment in the Ph.D. program.

Dissertation

Each student must complete a research program approved by the student's dissertation advisor that yields a high quality, original and substantial piece of research. The Ph.D. dissertation describes this research and its results. The dissertation defense is a public presentation. A written copy of the dissertation must be made available to the Ph.D. IT Doctoral Committee, to each member of the Advisory Committee, and to the UNC Charlotte Graduate School at least three weeks before the public defense. The date of the defense must be publicly announced at least three weeks prior to the defense. The student must present the dissertation and defend it in a manner accepted by the Advisory Committee. The dissertation will be graded as pass/fail by the Advisory Committee and must be approved by the Dean of the Graduate School.

A student who fails the defense of a dissertation twice will be terminated from the Ph.D. program.

Residency Requirements

Each student must satisfy the residency requirement of one continuous full-time year (i.e., two consecutive semesters with the student being enrolled for at least nine graduate credit hours in each semester) after being admitted to the Ph.D. degree program.

Assistantships

Teaching and research assistantships are available on a competitive basis.

Tuition Waivers

Out-of-state tuition remissions and in-state tuition grants are available, on a competitive basis, to full time students with graduate assistantships from UNC Charlotte.

Research Opportunities/Experiences

Students may participate in many of the on-going research projects occurring at UNC Charlotte.

Courses In Information Technology – Doctoral

(Computer Science (ITCS), Software and Information Systems (ITIS), Business Information Systems and Operations Management (INFO & OPER))

Students can also select graduate level courses in other disciplines e.g. College of Business, College of Engineering.

ITCS 8010. Topics in Computer Science. (3) Prerequisite: consent of the department. Topics in computer science selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 8050. Topics in Intelligent Systems. (3) Prerequisite: consent of the department. Topics in intelligent systems selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 8080. Topics in Computer Engineering. (3) Prerequisite: consent of the department Topics in computer engineering selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 8107. Formal Languages and Automata. (3) Prerequisites: one semester of discrete structures or consent of the department. Detailed study of abstract models for the syntax of programming languages and information processing devices. Languages and their representation; grammars; finite automata and regular sets; context-free grammars and pushdown automata; Chomsky Hierarchy; closure properties of families of languages; syntax analysis. *(On demand)*

ITCS 8110. Topics in Programming Languages and Compilers. (3) A continuation of material in ITCS 5128 with emphasis on advanced aspects of optimization, data flow analysis, and error discovery. *(On demand)*

ITCS 8111. Evolutionary Computation. (3) Prerequisite: ITCS 8114 or consent of the department. General introduction to optimization problems. Optimization techniques: hill climbing, simulated annealing, evolution strategies, genetic algorithms. Evolution programming techniques. *(Even, Spring) (Evenings)*

ITCS 8112. Software Systems Design and Implementation. (3) Prerequisite: consent of the department. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on human interface aspects of

systems. Planning software projects; software design process; top-down design; modular and structured design; management of software projects; testing of software; software documentation; choosing a language for software system. This course is cross listed with ITIS 8112. *(Fall, Spring)(Evenings)*

ITCS 8114. Algorithms and Data Structures. (3) Prerequisite: full graduate standing. Introduction to techniques and structures used and useful in design of sophisticated software systems. Records; arrays; linked lists; queues; stacks; trees; graphs; storage management and garbage collection; recursive algorithms; searching and sorting; graph algorithms; time and space complexity. *(Fall, Spring) (Evenings)*

ITCS 8115. Advanced Topics in Algorithms and Data Structures. (3) Prerequisite: ITCS 8114 or equivalent. Continuation and extension of ITCS 6114. String matching; seminumerical algorithms; probabilistic algorithms; parallel algorithms; NP-completeness; computationally hard problems; approximation algorithms. *(On demand)*

ITCS 8120. Computer Graphics. (3) Prerequisite: full graduate standing or consent of the department. Introduction to the design and implementation of interactive graphics systems. Raster and vector display systems, I/O devices; graphics primitives and their attributes; raster algorithms and clipping; 2D/3D geometric transformations; 3D viewing and projections; hierarchical and procedural models; surface representation; color and lighting models; rendering algorithms; global illumination and texture mapping. *(Fall) (Evenings)*

ITCS 8130 Advanced Computer Graphics. (3) Prerequisites: ITCS 8120 or equivalent, or consent of department. Implicit and parametric representation; cubic surfaces; advanced reflection models; global illumination models - ray tracing, radiosity; shadow algorithms, texture mapping; volumetric modeling and rendering techniques; animation; advanced modeling techniques; particle systems, fractals. *(On demand)*

ITCS 8132. Modeling and Analysis of Communication Networks. (3) Prerequisite: A course in communication networks, or consent of the department. The objective of this course is to develop an understanding of modeling and analysis techniques for communication systems and networks. The intent is to enable the student to understand how to comparatively analyze the cost and performance impact of network architecture and protocol design decisions. Modeling techniques for analytical analysis, simulation based analysis, and measurement based analysis will be presented. Concepts covered include validation/verification of models, workload characterization, metric selection, presentation and interpretation of results. A semester long analysis project will be undertaken. *(On demand)*

ITCS 8134. Digital Image Processing. (3) Prerequisite: full graduate standing or consent of the department. Cross-listed as ECGR 6118. Image perception; image types/applications; image restoration and enhancement; edge/boundary detection; image transformation; image segmentation; statistical and syntactical pattern recognition; image information measures and compression. *(Even, Spring) (Evenings)*

ITCS 8140. Data Visualization. (3) Prerequisite: full graduate standing or consent of department. Emphasis on the methodology and application of data visualization to scientific and engineering data; data types and models; visualization methods; volume visualization; scalar, vector and tensor fields; multi-variate visualization; visualization systems and model; visualization applications; visualization software and hardware; research issues and future trends. *(Odd, Spring)(Evenings)*

ITCS 8144. Operating Systems Design. (3) Prerequisite: ITCS 8114 or consent of department. Introduction to features of a large-scale operating system with emphasis on resource-sharing environments. Computer system organization; resource management; multiprogramming; multi-processing; file systems; virtual machine concepts; protection and efficiency. *(Even, Spring) (Evenings)*

ITCS 8148. Advanced Object-Oriented Systems. (3) Prerequisites: ITCS 8112 or equivalent. This course focuses on issues related to the design, implementation, integration, and management of large object-oriented systems. Topics include: object models, object modeling, frameworks, persistent and distributed objects, and object-oriented databases. This course is cross-listed with ITIS 8112 *(Spring)(Alternate Years)(Evenings)*

ITCS 8150. Intelligent Systems. (3) Prerequisites: full graduate standing or consent of the department. To introduce core ideas in AI. Heuristic versus algorithmic methods; problem solving; game playing and decision making; automatic theorem proving; pattern recognition; adaptive learning; projects to illustrate theoretical concepts. *(Fall) (Evenings)*

ITCS 8153. Neural Networks. (3) Prerequisites: ITCS 8114 . Topics include: Basic notions and models of artificial neural nets; single layer neural classifiers; multilayer one-way neural nets; single layer feedback networks; neural models of associative memory; self organizing neural nets; translation between neural networks and knowledge bases; applications of neural networks *(Even, Fall) (Evenings)*

ITCS 8154. Heuristic Search. (3) Prerequisite: ITCS 8150. Heuristics and problem representation; heuristic-search procedures; formal properties and performance

analysis of heuristic methods; game-searching strategies and heuristic programming; search with probabilities; knowledge-guided search. *(On demand)*

ITCS 8155. Knowledge-Based Systems. (3) Prerequisite: ITCS 8162 or consent of the department. Knowledge systems; knowledge discovery; association rules; query languages and operational semantics; decision systems; cooperative and collaborative systems; tree structured information systems; tree structured query languages; flexible query answering; chase algorithm based on rules; local and global ontologies; action rules; optimization problems for query answering systems. *(Even, Spring) (Evenings)*

ITCS 8156. Machine Learning. (3) Prerequisite: ITCS 8150 or consent of the department. Machine learning methods and techniques including: acquisition of declarative knowledge; organization of knowledge into new, more effective representations; development of new skills through instruction and practice; and discovery of new facts and theories through observation and experimentation. *(On demand)*

ITCS 8157. Visual Databases. (3) Prerequisites: ITCS 8160 or equivalent. Topics include: Representation of visual content, querying visual databases, content-based interactive browsing and navigation, system architecture, similarity models, indexing visual databases, data models and knowledge structures, image retrieval by similarity, and video retrieval by content. *(Even, Fall)(Evenings)*

ITCS 8158. Natural Language Processing. (3) Prerequisite: ITCS 8150. Principles, methodologies, and programming methods of natural language processing including foundations of natural language understanding, namely: lexical, syntactic, and semantic analysis, discourse integration, and pragmatic and morphological analysis. *(On demand)*

ITCS 8160. Database Systems. (3) Prerequisite: ITCS 8114 or consent of the department. Introduction to principles of database design, and survey of alternative database organizations and structures. Logical database organization; schemas; subschemas; data description languages; hierarchical, network, and relational databases; database management systems; normal forms. *(Fall, Spring)(Evenings)*

ITCS 8161. Advanced Topics in Database Systems. (3) Prerequisite: ITCS 8160 or equivalent. Continuation of ITCS 6160. Topics include deductive databases; semantic query processing; intelligent and cooperative query languages; distributed databases; active databases; heterogeneous databases, multimedia databases; data and knowledge interchange; multidatabase systems; very large databases. *(Odd, Spring)(Evenings)*

ITCS 8162. Knowledge Discovery in Databases. (3) Prerequisite: ITCS 8160 or consent of the department. The entire knowledge discovery process is covered in this course. Topics include: setting up a problem, data preprocessing and warehousing, data mining in search for knowledge, knowledge evaluation, visualization and application in decision making. A broad range of systems, such as OLAP, LERS, DatalogicR+, C4.5, AQ15, Forty-Niner, CN2, QRAS, and discretization algorithms are covered. *(Fall) (Evenings)*

ITCS 8163. Data Warehousing. (3) Prerequisite: ITCS 8160 or equivalent. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL queries; the warehouse data models: multidimensional, star, snowflake; architecture of data warehouse and the process of warehouse construction; data consolidation from various sources; optimization; techniques for data transformation and knowledge extraction; relations with enterprise modeling. *(Odd, Spring) (Evenings)*

ITCS 8164. Design and Implementation of Online Management Information Systems. (3) Prerequisites: ITCS 8114 or consent of the department. The fundamental concepts and philosophy of planning and implementing an on-line computer system. Characteristics of on-line systems; hardware requirements; modeling of on-line systems; performance measurement; language choice for on-line systems; organization techniques, security requirements; resource allocation. *(On demand)*

ITCS 8165. Coding and Information Theory. (3) Prerequisite: knowledge of probability theory. Information theory; coding theory; Shannon's theorem; Markov process; channel capacity; data transmission codes; error correcting codes; data compression; data encryption. *(Odd, Fall)(Evenings)*

ITCS 8166. Computer Communications and Networks. (3) Introduction to the concepts of communication networks; Types of networks; wired and wireless media; communication architectures; network protocols; coding and modulation; multiplexing and multiple access; error and flow control; routing; Internet Protocols; transport protocols; Assignments include implementation and analysis of network protocols. *(Fall) (Evenings)*

ITCS 8170. Logic for Artificial Intelligence. (3) Prerequisite: ITCS 8150 or consent of the department. Introduction to basic concepts of logic for artificial intelligence, including declarative knowledge, inference, resolution, nonmonotonic reasoning, induction, reasoning with uncertain beliefs, distributed information systems, intelligent information systems, planning and intelligent-agent architecture. *(On demand)*

ITCS 8171. Logic Programming. (3) Prerequisite: ITCS 8150 or consent of the department. Prolog programming language; programming techniques in Prolog; foundations of logic programming including computability of Horn

clause logic, completeness of resolution principle, complexity of unification algorithms, and verification of logic programs; principles of implementing logic programming systems; selected topics from applications of logic programming to expert systems, intelligent database systems, and/or natural language processing. *(On demand)*

ITCS 8175. Computability and Complexity. (3) Prerequisite: consent of the department. Study of computability, unsolvability, computational complexity. Concept of effective computability; recursive functions; mathematical models of computation; universal Turing machines; unsolvable problems; time and space complexity of computations; NP-completeness problems; subrecursive hierarchies. *(On demand)*

ITCS 8181. Switching and Automata Theory. (3) Prerequisite: consent of the department. Topics include sets, relations, lattices, Boolean algebras; functional decomposition and symmetric functions; threshold logic; multiple-valued logic; fault detection and fault tolerant design; finite state machines, incompletely specified machines, minimization; state identification and fault detection experiments; finite state recognizers. *(On demand)*

ITCS 8182. Advanced Computer Architecture. (3) Prerequisite: ITCS 5141. Survey of existing and proposed architectures; pipelined, dataflow, restructurable, and supercomputer architectures. Multicomputer and multiprocessor architectures. Impact of VLSI on architecture. *(Odd, Fall) (Evenings)*

ITCS 8183. Computer Arithmetic. (3) Prerequisite: consent of the department. Principles, architecture, and design of fast two operand adders; multioperand adders, standard multipliers, and dividers. Cellular array multipliers and dividers. Floating point processes, BCD, and excess three adders, multipliers, and dividers. *(On demand)*

ITCS 8184. Fault Tolerant Digital Systems. (3) Prerequisite: ITCS 5141. Design and analysis of fault tolerant digital systems including design techniques, qualitative and quantitative methods of evaluation, and available fault tolerant digital systems. *(On demand)*

ITCS 8186. Application Specifics System Design and Simulation. (3) Prerequisite: ITCS 5141 or equivalent, or consent of the department. Project oriented course on techniques and methodology in design and development of special purpose systems valuable for business, healthcare, and industrial community; course content include system specifications, interface structure and data communication, interconnection architecture, and techniques for testing and debugging. *(Fall) (Even years)*

ITCS 8220. Pattern Recognition. (3) Prerequisites: Graduate standing. Topics include: Pattern pre-processing and feature extraction (entropy minimization, orthogonal expansion, Fourier expansion, Karhunen-Loeve expansion, PCA); linear decision functions; orthogonal and non-orthogonal systems of functions; pattern classification by distance functions (Nearest Neighbor, K-means, ISODATA); pattern classification by likelihood functions (Bayesian classifiers, estimation of probability density function); trainable classifiers (LMSE, Perceptron, multi-layer perceptrons, fuzzy classifiers); stochastic processes; classification on categorical attributes. *(Odd, Fall) (Evenings)*

ITCS 8222. Biomedical Signal Processing. (3) Prerequisites: Graduate standing. Topics include: Fundamental techniques in processing, analysis, feature extraction, and classification of complex signals; origin and processing techniques for biomedical signals, including ECG, ENG, EEG, MEG, ERG, EMG, respiratory signals, blood sound, and pressure signals. *(On demand)*

ITCS 8224. Biomedical Image Processing. (3) Prerequisites: Graduate standing, and Math 2164 or its equivalent. Topics include: Review of image processing and pattern recognition (2-D Fourier transforms, 2-D Wavelet transform, denoising of medical images); origin and processing of X-ray images; CT images; MRI images; ultrasonic images; PET images; thermal images; electrical impedance images; cross-registration between images of different source; stereotactic neurosurgery; stereotactic radiosurgery/radiotherapy; robot-assisted surgery. *(Odd, Spring) (Evenings)*

ITCS 8226. Bioinformatics. (3) Prerequisites: Graduate standing. Topics include: Brief Review of molecular biology, proteins and their classifications, DNA, RNA, and using microarrays and gene chips for sequencing; review of computational techniques for bioinformatics, expectation maximization, Bayesian classifiers, dynamic programming, information theory and entropy analysis, Markov chain models, and neural networks; computational techniques for local and multiple sequence alignment; application of Markov chains in finding genes; using information theory to estimate binding sites, start Codon prediction; RNA secondary structure prediction; computational techniques for protein function prediction; Advanced signal processing techniques in feature extraction from protein sequences. *(On demand) (Evenings)*

ITCS 8265. Advanced Topics in Knowledge Discovery in Databases. (3) Continuation and extension of ITCS 8162. Information visualization in data mining and knowledge discovery, predictive data mining, mining of multimedia sources, mining of unstructured data, distributed data mining, mining of Web data/information, mining complex types of data, mining of biotechnology data, applications and trends in data mining. *(On demand)*

ITCS 8267. Intelligent Information Retrieval. (3) Prerequisites: ITCS 8114 or consent of the department. Topics include: definition of the information retrieval problem, modeling the information retrieval problem, evaluation of information retrieval, query languages and operations, text processing, indexing and searching, parallel and distributed information retrieval, user interface and visualization, multimedia information retrieval, and information retrieval applications. *(Even, Spring) (Evenings)*

ITCS 8690. Computer Science Seminar. (3) Prerequisites: at least 18 graduate ITCS/ITIS hours and consent of department. Experience for the advanced Ph.D. student on current problems of computer design and application. (May be used by a student or small group of students to work with a professor on a topic of mutual interest. May be used to give a course on a topic announced in advance.) *(On demand)*

ITIS 8112. Software System Design and Implementation. (3) Prerequisite: consent of the department. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on human interface aspects of systems. Planning software projects; software design process; top-down design; modular and structured design; management of software projects; testing of software; software documentation; choosing a language for software system. This course is cross listed with ITCS 8112. *(Fall) (Spring) (Evenings)*

ITIS 8130. Software Requirements Engineering for Information Systems. (3) Pre-requisite: Full graduate standing, or consent of the Department. Introduction to requirement engineering methodologies. Topics include: requirements elicitation, specification, and validation; structural, informational, behavioral, security, privacy, and computer user interface requirements; scenario analysis; application of object-oriented methodologies in requirements gathering; spiral development models; risk management models; software engineering maturity model. *(On demand)*

ITIS 8140. Software Testing and Quality Assurance. (3) Prerequisite: ITIS 6112 or consent of the Department. Methods for evaluating software for correctness, and reliability including code inspections, program proofs and testing methodologies. Formal and informal proofs of correctness. Code inspections and their role in software verification. Unit and system testing techniques, testing tools and limitations of testing. Statistical testing, reliability models. Software engineering maturity model. *(On demand)*

ITIS 8148. Advanced Object-Oriented Systems. (3) Prerequisites: ITIS 8112 or equivalent. This course focuses on issues related to the design, implementation, integration, and management of large object-oriented systems. Topics include: object models, object modeling, frameworks, persistent and distributed objects, and object-oriented databases. This course is cross-listed with ITCS 8112. *(Spring)(Alternate Years)(Evenings)*

ITIS 8156. Computer-Aided Instruction. (3) Prerequisite: consent of the department. History of CAI; study of current CAI systems; development of man-machine dialogue; programming tools for CAI; information structures for computer-oriented learning. Advantages/disadvantages/costs of CAI. *(On demand)*

ITIS 8163. Data Warehousing. (3) Prerequisite: ITCS 8160 or equivalent. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL queries; the warehouse data models: multidimensional, star, snowflake; architecture of data warehouse and the process of warehouse construction; data consolidation from various sources; optimization; techniques for data transformation and knowledge extraction; relations with enterprise modeling. This course is cross listed as ITCS 8163. *(Odd, Spring) (Evenings)*

ITIS 8164. Online-Info Systems. (3) Prerequisites: ITCS 6114 or consent of the department. The fundamental concepts and philosophy of planning and implementing an on-line computer system. Characteristics of on-line systems; hardware requirements; modeling of on-line systems; performance measurement; language choice for on-line systems; organization techniques, security requirements; resource allocation. *(On demand)*

ITIS 8167. Network and Information Security. (3) Prerequisite: ITCS 6166 or equivalent. This course examines the issues related network and information security. Topics include concepts, security attacks and risks, security architectures, security policy management, security mechanisms, cryptographic algorithms, security standards, security system interoperation and case studies of the current major security systems. *(Fall) (Evening)*

ITIS 8177. System Integration. (3) Prerequisite: ITIS 5166 and ITIS 5160, or equivalents. This course examines the issues related to system integration. Topics include: data integration, business process integration, integration architecture, middleware, system security, and system management. *(Fall) (Evening)*

ITIS 8200. Principles of Information Security and Privacy. (3) Prerequisite: consent of the department. Topics include security concepts and mechanisms; security technologies; authentication mechanisms; mandatory and discretionary controls; basic cryptography and its applications; intrusion detection and prevention; information systems assurance; anonymity and privacy issues for information systems. *(Fall, Spring) (Evening)*

ITIS 8210. Access Control and Security Architecture. (3) Prerequisite: ITIS 8200. This course discusses objectives, formal models, and mechanisms for access

control; and access control on commercial off-the-shelf (COTS) systems. This course also examines the issues related to security architectures and technologies for authorization. Topics include cryptographic infrastructure, distributed systems security architectures, Internet security architectures, network security architectures and e-commerce security architectures. *(Spring)*
(Evening)

ITIS 8220. Information and System Assurance. (3) Prerequisites: ITIS 8200. This course examines the issues related to information and system assurance. Topics include security policy, security threats/vulnerabilities/risks/incidents, assurance requirement, assurance class, evaluation methods and assurance maintenance. *(On demand)*

ITIS 8230. Information Infrastructure Protection. (3) Prerequisite: ITIS 8200. This course examines the issues related to information and system assurance. Topics include security policy, security threats/vulnerabilities/risks/incidents, assurance requirement, assurance class, evaluation methods and assurance maintenance. *(On demand) (Evening)*

ITIS 8240. Applied Cryptography. (3) Prerequisite: Full graduate standing or consent of the department. This course provides students with an understanding of modern cryptographic techniques, algorithms and protocols that are of fundamental importance to the design and implementation of security critical applications. The course not only covers standard cryptographic techniques, but also exposes students to the latest advances in applied cryptography. Topics include secret and public key ciphers, stream ciphers, one-way hashing algorithms, authentication and identification, digital signatures, key establishment and management, secret sharing and data recovery, public key infrastructures, and efficient implementation. *(On demand)*

ITIS 8342. Information Technology Project Management. (3) Prerequisites: consent of the department. Introduce the student to problems associated with managing information technology projects involving, particularly, integration of systems, development of client-specific solutions, and project justification. The course will move beyond the classic techniques of project management and integrate communication software/systems, multi-site, multi-client facilities projects, cultural issues involved with managing interdisciplinary teams, and the effect of rapid technological obsolescence on project justification, funding and continuance. *(Spring)*

ITIS 8362. Information Technology Ethics, Policy, and Security. (3) Prerequisites: HADM 6152 or MBAD 6121 or MPAD 6120. Management of Information technology involves understanding the broader issues of ethics, Policy and Security. The growth in Internet usage and E-commerce require IT professionals to consider issues pertaining to data protection, regulation, and appropriate use and dissemination of information. The course is designed to be team-taught by professionals in the field. *(Fall)*

INFO 8100. Information Systems Research Methodologies. (3) Prerequisites: Graduate standing or permission of the instructor. A study of statistical and research methods used in information systems research. *(Fall)*

INFO 8120. Advanced Research Methodologies. (3) Prerequisites: INFO 8100 or consent of the department. A study of advanced research methods used in business administration and management information systems research. *(On demand)*

INFO 8201. Data and Knowledge Management in Business. (3) Prerequisite: MBAD 6121 or consent of the department and admission to the Ph.D. program in IT. An overview of the business approach to identifying, modeling, retrieving, sharing, and evaluating an enterprise's data and knowledge assets. Covers the organizational, technological and management perspectives. *(Fall)*

INFO 8202. Business Information Systems: Analysis, Design, and Management. (3) Prerequisites: MBAD 6121 or consent of the department. Examination of managerial issues associated with the study of business processes and the development of supporting information systems. Emphasis on the application of appropriate methodologies, techniques, and tools to analyze, design, and implement business information systems. Study of relevant IS project management and quality assurance techniques. *(Yearly)*

INFO 8203. Information Systems Economics, Strategy and Policy. (3) Prerequisite: MBAD 6121 or consent of the Department and admission to the Ph.D. program in IT. This course examines a collection of topics that deal with the strategic use of information systems (IS). These topics include Business Value of IS, Network Economics, use of IS for competitive advantage, IS Planning and policy setting, IS evaluation, selection and sourcing. *(Fall)*

INFO 8204. Business Data Communications. (3) Prerequisites: MBAD 6121 or consent of the department. Examination of the information communication requirements of business environments, the fundamentals of communication technology, and the application of the technology for solving business problems. Emphasis on understanding communication technologies to assess needs, plan for the introduction of hardware and software, and manage these communication systems. *(Yearly)*

INFO 8700. Advanced Topics in MIS. (3) Prerequisites: Consent of the department. Topics in MIS selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

INFO 8800. Information Systems Research Seminar. (3) Prerequisites: INFO 8100, or consent of the department. A study of current research areas in MIS. *(On demand)*

INFO 8900. Directed Individual Study in Business Information Systems. (3) Prerequisites: Directed individual study and in-depth analysis of a special area of MIS. The course may be used to satisfy up to six semester hours of graduate credit requirements in the Ph.D. in IT degree program and may be repeated for credit provided a different area of study is undertaken each time. Permission of a member of the doctoral faculty who would direct the study and permission of the department must be secured before registering for the course. *(On demand)*

OPER 8122. Technology Enhanced Decision Making. (3) Prerequisites: MBAD 5141 and MBAD 5142 or equivalents. An analytical approach to the management process. Generalized models for decision making with major emphasis on application of the scientific method to management problems. *(On demand)*

OPER 8208. Supply Chain Management. (3) Prerequisites: MBAD 6141 or consent of the Department. Supply chain management is concerned with all of the activities performed from the initial raw materials to the ultimate consumption of the finished product. From a broad perspective, the course is designed to examine the major aspects of the supply chain: the product flows; the information flows; and the relationships among supply chain participants. The course content is interdisciplinary in nature and will cover a variety of topics such as supply chain information technologies, supply chain design, strategic alliances between supply chain participants and supply chain initiatives. *(On Demand)*

ITSC 8110. Introduction to Information Technology Research. (3) Prerequisites: Good standing in the IT PhD Program. Information Technology has a wide range of research areas encompassing the fields of Business Information Systems, Bioinformatics, Computer Science, and Software and Information Systems. This seminar is intended to give IT PhD students a sound understanding of the different research areas in Information Technology. The seminar is to be taken during the first year of studies and is intended to be the gateway to the fields within Information Technology and will enable students to select the fields matching their interests early in their studies. Through attending weekly in-depth research presentations from faculty in all participating units in the PhD IT program and conducting literature surveys in areas of interest, students are expected to gain the knowledge they need to identify the areas of interest for themselves. *(Fall)*

ITSC 8123. Applied Management Science. (3) Prerequisite; MBAD 6122. Mathematical model building aimed at integrating methods and applications. Overview of mathematical programming in practice and a series of projects implementing models in business and the public sector. *(On demand)*

ITSC 8141. Operations Management. (3) Prerequisite: MBAD 5141 and MBAD 5142 or equivalents. Design, operation, and control of service and manufacturing systems. Emphasis on using analytical tools for problem solving in process analysis and re-engineering, work-force management, materials and inventory management, aggregate planning, total quality management, and others *(Fall, Spring)*

ITSC 8142. Quality and Manufacturing Management. (3) Prerequisite: MBAD 6141. Current issues and advances in operations management including just-in-time inventory management, total quality management, continuous improvement, flexible manufacturing systems, computer integrated manufacturing systems, technology evaluation and selection, and operations strategy. *(On demand)*

ITSC 8699. Graduate Research Seminar (1) Prerequisites: Good standing in the IT PhD Program. This seminar is intended to expose IT PhD students to current research in Information Technology through attending weekly research presentations by other students, IT faculty, and invited speakers. Each student is expected to give one or more presentations for the Graduate Research Seminar before graduation. Students must sign up for and received credit for the Graduate Research Seminar every semester that they are in the IT Ph.D. Program until they are admitted to Ph.D. candidacy. It is graded on Pass/No Credit basis. ITSC 8110 students should not register for ITSC 8699 for the same semester. *(Fall, Spring)*

ITSC 8880. Individual Study. (3) Prerequisites: consent of department. With the direction of a faculty member, students plan and implement appropriate objectives and learning activities to develop specific areas of expertise through research, reading, and individual projects. May be repeated for credit. *(On demand)*

ITSC 8990 Pre-dissertation Research (1~6) Prerequisites: Good standing in the IT PhD Program. Students conduct research in information technology under the direction of one or more IT PhD faculty. A major goal of this course is to prepare the student for the Qualifying Examination. May be repeated for credit. *(Fall, Spring)*

ITSC 8991. Doctoral Dissertation Research. (1-9) Individual investigation culminating in the preparation

and presentation of a doctoral dissertation. *(Fall, Spring, Summer)*

ITSC 9999. Doctoral Degree Graduate Residence. (1) *(Fall, Spring, Summer)*

SOFTWARE AND INFORMATION SYSTEMS

Software and Information Systems

Location: Cameron Applied Research Center 305
704-687-4770
http://www.sis.uncc.edu

Degree

M.S.I.T., Graduate Certificates

Coordinator

Dr. William J. Tolone

Graduate Faculty

Professors
Bei-Tseng "Bill" Chu
Yuliang Zheng

Associate Professor
William J. Tolone

Assistant Professors
Gail-Joon Ahn
ByungHoon "Brent" Kang
Seok-Won Lee
Zhaoyu "Alex" Liu
Anita Raja
Yongge Wang
David Wilson

Adjuncts
J. Foley, T. Inskeep, T. Kitrick, F. Williams, J. Zhao

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

The objective of the information technology program leading to the Master of Science degree is to provide advanced skills and knowledge in the planning, design, implementation, testing, and management of applications of computing and communication technologies for business, industry, government, and other organizations.

The primary areas of interest are: information security and privacy, information and infrastructure assurance, information integration, software engineering, intelligent information environment and pervasive computing applications, and knowledge management.

Additional Admission Requirements

1) In addition to the general requirements for admission to the Graduate School, the program requires applicants to have completed undergraduate course work, or equivalent, in an object-oriented programming language (e.g., C++ or Java) and in data structures with a minimum grade average of 3.0 on a 4.0 scale.
2) Students must have an undergraduate grade point average of at least 2.8 (on a 4.0 point scale) and a junior/senior GPA of at least 3.0.
3) A satisfactory score on the aptitude portion of the Graduate Record Examination or Graduate Management Admission Test is required.

Degree Requirements

A total of 30 graduate credit hours are required.

Required Courses

MBAD6121	Business Information Systems
ITIS5160	Applied Databases (please note that ITCS 6160 can be a substitute for ITIS 5160)
ITIS6177	Systems Integration
ITIS6342	Project Management

One of

ITIS 6112	Software System Design and Implementation
MBAD6202	Business Information Systems Development

One of

ITIS 5166	Network-based application development
MBAD6125	Business Data Communications

*Important prerequisite considerations for required courses:

ITIS 6177 requires ITIS 5166 and ITIS 5160 as prerequisites.

MBAD 6124 requires MBAD 6121 as a prerequisite.

Concentration Requirement

Each student must also complete a three-course (nine credit hours) sequence in an approved concentration area. Other concentration areas are possible with the approval of the MSIT Program Coordinator. In addition, the MSIT Program Coordinator can approve substitution of courses within approved concentrations. Details on concentration requirements are available on the department website and at the department office. Current concentrations include:

1) Advanced Data and Knowledge Discovery
2) Financial Service
3) Information Security and Privacy
4) Information Technology Management

5) Management
6) Marketing
7) Software Systems Design and Engineering

Master's Thesis Option
Students may elect to complete a master thesis (6 credit hours).

Assistantships
Financial assistance for qualified students is available on a competitive basis in the form of graduate teaching and research assistantships. The deadline for graduate teaching assistantship applications is March 31 for the following academic year.

Practica
Students can elect to participate in a practica (ITIS 6198).

CERTIFICATE IN INFORMATION SECURITY AND PRIVACY

The purpose of the Certificate in Information Security and Privacy is to meet the needs of persons who are interested in pursuing a career in this important area of Information Technology. The proposed certificate program may also serve the education needs of IT-related professionals in the Charlotte area seeking more advanced knowledge of this fast growing field. The certificate requires 12 hours of coursework. The certificate may be pursued concurrently with a related graduate degree program at UNC-Charlotte.

Admission Requirements
For admission into the certificate program, applicants must meet the following requirements:
1) Applicant should hold a Bachelor's degree in a computer science, IT, mathematics, scientific, engineering, or business discipline.
2) Applicant must demonstrated knowledge of a modern object-oriented programming language such as C++ or Java, and a background in data structures.
3) Applicants must either be enrolled and in good standing in a graduate degree program at UNC Charlotte, or have an undergraduate overall GPA above 2.8 (on a 4.0 scale) and a junior/senior GPA above 3.0.

Applicants are required to submit a brief (one-to-two page) statement of educational and work experiences. Application for this certificate program is made through the Office of Graduate Admissions. (**Note: the admission process for the Certificate is separate from the admission process for the MS degree.**)

Coursework Requirements
1) Take the following core course:

ITIS6200	Information Security and Privacy (3)

2) Take three courses from the following elective courses[1]:

ITIS5250	Computer Forensics (3)
ITIS6210	Access Control and Security Architecture (3)
ITIS6220	Information and System Assurance (3)
ITIS6230	Information and Infrastructure Protection (3)
ITIS6240	Applied Cryptography (3)
ITIS6362	Information Technology: Ethics, Policy and Security (3)
ITIS6167	Information and Network Security (3)
ITIS6140	Software Testing and Quality Assurance (3)
ITIS6198	IT internship projects
One of	
ITIS5166	Network-based Application Development (3)
ITCS6166	Computer Communication Networks (3)

[1] *Other course options may be available, please contact the program coordinator.*

All requirements must be completed within four years from enrollment in the first certificate course. **Courses taken in one certificate program may not be counted toward a second certificate.**

CERTIFICATE IN MANAGEMENT OF INFORMATION TECHNOLOGY

The Certificate in Management of Information Technology meets the demand for a growing number of individuals who are working in an IT related discipline and are interested in acquiring some formal IT training for career or educational purposes. The Certificate requires 15 hours of coursework. Some of the courses (indicated by asterisks) require substantial programming prerequisites.

Additional Admission Requirements
For admission, applicants must hold a Bachelor's degree from an accredited institution and meet the admission requirements of the UNC Charlotte Graduate School. Applicants must have an undergraduate overall GPA above 2.8 (on a 4.0 scale) and a junior/senior GPA above 3.0. Applicants must also have working knowledge of applications of Information Technology. (**Note: the admission process for the Certificate is separate from the admission process for the MS degree.**)

Core Requirements
Both of the following courses are required:

ITIS6342	Information Technology Project Management (3)
ITIS6362	Information Technology: Ethics, Policy, and Security (3)

One of the following courses is required depending on student interests and/or background:

HADM6152	Information Resource Management (3)
MBAD6121	Business Information Systems (3)
MPAD6160	Information Systems in Public Administration (3)

Two electives from the following list is required:

ITIS6200	Principles of Information Security and Privacy (3)
ITIS6230	Information and Infrastructure Protection (3)
ITIS6112*	Software System Design and Implementation (3)
ITIS5160*	Applied Database (3)
ITIS5166*	Network Based Application Development (3)
GEOG6615	Advanced Seminar in Spatial Decision Support Systems (4)
INFO6352	Electronic Commerce (3)
MBAD6122	Technology-Enhanced Decision Making (3)
MBAD6202	Business Information Systems Development (3)

* Requires knowledge of object-oriented programming language (e.g. Java), and data structures.

All requirements must be completed within four years from enrollment in the first certificate course. **Courses taken in one certificate program may not be counted toward a second certificate.**

Courses In Software And Information Systems

ITIS 5156. Computer-Aided Instruction. (3) Prerequisite: consent of the department. History of CAI; study of current CAI systems; development of man-machine dialogue; programming tools for CAI; information structures for computer-oriented learning. Advantages/disadvantages/costs of CAI. *(On demand)*

ITIS 5160. Applied Databases. (3) Prerequisites: full graduate standing, or consent of department. Identification of business database needs; requirements specification; relational database model; SQL; E-R modeling; database design, implementation, and verification; distributed databases; databases replication; object-oriented databases; data warehouses; OLAP; data mining; security of databases; vendor selection; DBMS product comparison; database project management; tools for database development, integration, and transaction control. *(Fall) (Evening)*

ITIS 5166. Network-Based Application Development. (3) Prerequisite: Full graduate standing or consent of the department. This course examines the issues related to network based application development. Topics include introduction to computer networks, web technologies and standards, network based programming methodologies, languages, tools and standards *(Spring) (Evening)*

ITIS 5250. Computer Forensics. (3) Prerequisite: Enrollment in MS IT or Consent of the Department. The identification, extraction, documentation, interpretation, and preservation of computer media for evidentiary purposes and/or root cause analysis. Topics include techniques for discovering digital evidence; responding to electronic incidents; tracking communications through networks; understanding electronic media, crypto-literacy, data hiding, hostile code, and Windows™ and UNIX™ system forensics; and the role of forensics in the digital environment. *(On Demand)*

ITIS 6112. Software System Design and Implementation. (3) Prerequisite: consent of the department. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on human interface aspects of systems. Planning software projects; software design process; top-down design; modular and structured design; management of software projects; testing of software; software documentation; choosing a language for software system. *(Fall) (Spring) (Evenings).* This course is cross-listed with ITCS 6112.

ITIS 6130. Software Requirements Engineering for Information Systems. (3) Pre-requisite: Full graduate standing, or consent of the Department. Introduction to requirement engineering methodologies. Topics include: requirements elicitation, specification, and validation; structural, informational, behavioral, security, privacy, and computer user interface requirements; scenario analysis; application of object-oriented methodologies in requirements gathering; spiral development models; risk management models; software engineering maturity model. *(On demand)*

ITIS 6140. Software Testing and Quality Assurance. (3) Prerequisite: ITIS 6112 or consent of the Department. Methods for evaluating software for correctness and reliability including code inspections, program proofs and testing methodologies. Formal and informal proofs of correctness. Code inspections and their role in software verification. Unit and system testing techniques, testing tools and limitations of testing. Statistical testing, reliability models. Software engineering maturity model. *(On demand)*

ITIS 6148. Advanced OO Design and Implementation. (3) Prerequisites: ITIS 6112, or equivalent courses. This course focuses on issues related to the design, implementation, integration, and management of large object-oriented systems. Topics include: object models, object modeling, frameworks, persistent and distributed objects, and object-oriented

databases. *(Spring) (Alternate Years)* This course is cross-listed with ITCS 6148.

ITIS 6162. Knowledge Discovery in Databases. (3) Prerequisite: ITCS 6160, full graduate standing, or consent of the department. The entire knowledge discovery process is covered in this course. Topics include: setting up a problem, data preprocessing and warehousing, data mining in search for knowledge, knowledge evaluation, visualization and application in decision making. A broad range of systems, such as OLAP, LERS, DatalogicR+, C4.5, AQ15, Forty-Niner, CN2, QRAS, and discretization algorithms will be covered. *(Summer) (Evenings)*

ITIS 6163. Data Warehousing. (3) Prerequisite: ITCS 6160 or equivalent. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL queries; the warehouse data models: multidimensional, star, snowflake; architecture of data warehouse and the process of warehouse construction; data consolidation from various sources; optimization; techniques for data transformation and knowledge extraction; relations with enterprise modeling. *(On demand)* This course is cross-listed as ITCS 6163.

ITIS 6164. Online-Info Systems. (3) Prerequisites: ITCS 6114 or consent of the department. The fundamental concepts and philosophy of planning and implementing an on-line computer system. Characteristics of on-line systems; hardware requirements; modeling of on-line systems; performance measurement; language choice for on-line systems; organization techniques, security requirements; resource allocation. *(On demand)*

ITIS 6167. Network and Information Security. (3) Prerequisite: ITCS 6166 or ITIS 5166 or equivalent. This course examines the issues related network and information security. Topics include concepts, security attacks and risks, security architectures, security policy management, security mechanisms, cryptographic algorithms, security standards, security system interoperation and case studies of the current major security systems. *(Fall) (Evening)*

ITIS 6177. System Integration. (3) Prerequisite: ITIS 5166 and ITIS 5160, or equivalents. This course examines the issues related to system integration. Topics include: data integration, business process integration, integration architecture, middleware, system security, and system management. *(Fall) (Evening)*

ITIS 6198. IT Project. (3) Prerequisite: consent of the department. Complete a team-based project that is originated from an IT organization and approved by the department.

ITIS 6200. Principles of Information Security and Privacy. (3) Prerequisite: Consent of the department. Topics include security concepts and mechanisms; security technologies; authentication mechanisms; mandatory and discretionary controls; basic cryptography and its applications; intrusion detection and prevention; information systems assurance; anonymity and privacy issues for information systems. *(Fall, Spring) (Evening)*

ITIS 6210. Access Control and Security Architecture. (3) Prerequisite: ITIS 6200. This course discusses objectives, formal models, and mechanisms for access control; and access control on commercial off-the-shelf (COTS) systems. This course also examines the issues related to security architectures and technologies for authorization. Topics include cryptographic infrastructure, distributed systems security architectures, Internet security architectures, network security architectures and e-commerce security architectures. *(Spring) (Evening)*

ITIS 6220. Information and System Assurance. (3) Prerequisite: ITIS 6200. This course examines the issues related to information and system assurance. Topics include security policy, security threats/vulnerabilities/risks/incidents, assurance requirement, assurance class, evaluation methods and assurance maintenance. *(On demand) (Evening)*

ITIS 6230. Information Infrastructure Protection. (3) Prerequisite: ITIS 6200. This course discusses methodologies, tools, and technologies that are important for protecting information systems and information infrastructures. Topics covered include: techniques, processes and methodologies for information security risk assessment and management, tools and technologies for critical infrastructure protection, methodologies for continuous operation and recovery from disasters. *(On Demand)*

ITIS 6240. Applied Cryptography. (3) Prerequisite: Full graduate standing or consent of the department. This course provides students with an understanding of modern cryptographic techniques, algorithms and protocols that are of fundamental importance to the design and implementation of security critical applications. The course not only covers standard cryptographic techniques, but also exposes students to the latest advances in applied cryptography. Topics include secret and public key ciphers, stream ciphers, one-way hashing algorithms, authentication and identification, digital signatures, key establishment and management, secret sharing and data recovery, public key infrastructures, and efficient implementation. *(On demand)*

ITIS 6342. Information Technology Project Management. (3) Prerequisite: Consent of the department. Introduce the student to problems associated with managing information technology projects involving, particularly, integration of systems, development of client-specific solutions, and project justification. The course will move beyond the classic techniques of project

management and integrate communication software/systems, multi-site, multi-client facilities projects, cultural issues involved with managing interdisciplinary teams, and the effect of rapid technological obsolescence on project justification, funding and continuance. *(Offered: Spring)*

ITIS 6362. Information Technology Ethics, Policy, and Security. (3) Prerequisite: HADM 6152 or MBAD 6121 or MPAD 6120. Management of Information technology involves understanding the broader issues of ethics, Policy and Security. The growth in Internet usage and E-commerce require IT professionals to consider issues pertaining to data protection, regulation, and appropriate use and dissemination of information. The course is designed to be team-taught by professionals in the field. *(Offered: Fall)*

ITIS 6880. Individual Study. (1-3) Prerequisites: At least 9 graduate ITCS/ITCS hours and consent of department. With the direction of a faculty member, students plan and implement appropriate objectives and learning activities to develop specific areas of expertise through research, reading, and individual projects. May be repeated for credit. *(On demand)*

ITIS 6991. Graduate Master Thesis Research. (1-6) Prerequisite: HADM 6152 or MBAD 6121 or MPAD 6120. Management of Information technology involves understanding the broader issues of ethics, Policy and Security. The growth in Internet usage and E-commerce require IT professionals to consider issues pertaining to data protection, regulation, and appropriate use and dissemination of information. The course is designed to be team-taught by professionals in the field. *(Fall)*

INTER-COLLEGE GRADUATE PROGRAMS

INFRASTRUCTURE AND ENVIRONMENTAL SYSTEMS (INES)

Ph.D. in Infrastructure and Environmental Systems

704-687-3688
http://www.uncc.edu/gradmiss/inesindex.html
http://www.ce.uncc.edu/INES/

Degree

Ph.D.

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James Oliver, Ph.D.
Todd R. Steck, Ph.D.
Inna Sokolova, Ph.D.
Chemistry
Brian T. Cooper, Ph. D.
Bernadette T. Donovan-Merkert, Ph.D.
Thomas D. DuBois, Ph. D.
Kenneth Gonsalves, Ph.D.
Walter Craig Ogle, Ph.D.
Jordan Poler, Ph.D.
Wade Sisk, Ph.D.
Civil Engineering
Brian J. Anderson, Ph.D.
James Bowen, Ph.D.
John Daniels, Ph.D.
David Boyajian, Ph.D.
Janos Gergely, Ph.D.
Johnny R. Graham, Ph.D.
Helene Hilger, Ph.D.
Hilary I. Inyang, Ph.D.
Rajaram Janardhanam, Ph.D.
Martin R. Kane, Ph.D.
David C. Weggel, Ph.D.
Jy Wu, Ph.D.
David Young, Ph.D.
Economics
Gaines H. Liner, Ph.D.
Stanislov Radchenko, Ph.D.
Peter Schwarz, Ph.D.
Geography & Earth Science
Craig Allan, Ph.D.
John Bender, Ph.D.
Andy Bobyarchick, Ph.D.
Harrison S. Campbell, Ph.D.
Kenneth M. Chilton, Ph.D.
John Diemer, Ph.D.
Martha C. Eppes, Ph.D.
Owen Furuseth, Ph.D.
Edd Hauser, Ph.D.
Scott P. Hippensteel, Ph.D.
Gerald Ingalls, Ph.D.
Mark Thomasson, Ph.D.
Wei-Ning Xiang, Ph.D.
Engineering Management
S. Gary Teng, Ph.D.
Ertunga Ozelkan, Ph.D.
Yesim Sireli, Ph.D.

PH.D. IN INFRASTRUCTURE AND ENVIRONMENTAL SYSTEMS (INES)

The Ph.D. in Infrastructure and Environmental Systems (INES) is an interdisciplinary program focusing on the complex challenges facing urbanized regions, specifically those issues related to the interplay between the environment and infrastructure needed to support the regions' economic and social development. Understanding and solving these challenges require an innovative approach that considers three aspects (engineering, science, and management) of optimal solutions and that promotes an understanding of the interdependency of the three in earth, civil, and industrial systems.

Graduates of the INES Ph.D. program will have an understanding of complex, interdisciplinary infrastructure and environmental systems and will make significant contributions to the advancement of knowledge of those systems in academia, local, state or federal government, and not-for-profit and for-profit institutions. The educational objectives designed to achieve these goals are:

1) to provide students with educational opportunities in science, engineering, and management, culminating in an interdisciplinary research-based Ph.D. in Infrastructure and Environmental Systems;

2) to prepare students for careers as doctoral-level research scientists, engineers, and resource and systems managers who will lead in developing the next generation of infrastructure and environmental technology;
3) to involve students in the support and expansion of the base of research in rapidly growing fields related to infrastructure and environmental systems in the Charlotte region, North Carolina, and across the nation and world;
4) to enhance the educational experience in science and engineering for all students, graduate and undergraduate, at UNC Charlotte; and
5) to expand the educational experience of students by participating in the activities of interdisciplinary institutes at UNC Charlotte such as the Global Institute for Environmental and Energy Systems (GIEES), the Center for Transportation Policy Studies, and the UNC Charlotte Urban Institute.

Admission Requirements

The following are general guidelines for successful admissions into the Ph.D. in Infrastructure and Environmental Systems:

1) The equivalent to a U.S. baccalaureate or master's degree, from a regionally accredited college or university, in Engineering, Earth Science/Geology, Chemistry, Biology or a related field with a minimum undergraduate GPA of 3.2 or a minimum graduate GPA of 3.5 (A = 4.0) in all graduate work.
2) Acceptable scores on the verbal, quantitative and analytical sections of the Graduate Record Examination (GRE). The INES Admissions Committee generally expects aggregate GRE scores to be in the upper 50th percentile.
3) A minimum score of 220 (computer-based test) or 557 (paper-based test) on the Test of English as a Foreign Language (TOEFL) for applicants whose native language is not English.
4) Three letters of reference, two of which must be from faculty members.
5) An essay which addresses the applicant's motivation and area of research interest.
6) Students entering the program will be expected to remedy any course work deficiencies identified by their advisory committee in the first semester after enrolling in the program. The amount and kinds of remedial
7) Course work required for the program will depend on the background of the student and will be established by the INES Admissions Committee and the student's advisory committee. It is important to note that this program will emphasize the quantitative and analytical skills necessary to confront the challenges of urban and regional growth and development.

Documents to be Submitted for Application for Admission

The Office of the Graduate School at UNC Charlotte requires the following documents be submitted in the application package for each student:

1) Two official transcripts from all colleges and universities attended
2) Official GRE scores (verbal, quantitative and analytical)
3) Official TOEFL scores if the student's native language is not English.
4) The UNC Charlotte application for graduate admission form
5) Three letters of reference
6) The essay which addresses the applicant's motivation, prospective INES Ph.D. program focus area (IESD or IESS or IESM), and research issues of interest.

Admission Assessment

1) An Admissions Committee will review applications and recommend to the Program Director whether each applicant should be admitted or not and, if so, under what conditions.
2) The Program's Admissions Committee will assess each student's previous academic coursework in light of the student's stated direction of study. This assessment will be used to identify the strengths and weaknesses of the student's previous academic history and to suggest specific course work, if required, for the student's program of study. The amount and kinds of any remedial course work required for the program will depend on the student's background and will be established by the Admissions Committee and confirmed by the Program Director. The Admissions Committee may also suggest specific coursework based on the student's intended direction of study within the program. The Admissions Committee will conduct this assessment upon the student's acceptance and formal declaration of intent to attend. For each entering student, a member of the INES Ph.D. Faculty will be selected to serve as his or her major advisor for the first year in the Program.

Student Responsibility

Students entering the program must present evidence that they are capable of undertaking the coursework required of them. Such evidence must include familiarity, background, and/or interest in infrastructure and environmental issues, in one of the focus areas of design (engineering), science, or management.

Students may have completed equivalent courses elsewhere. Normally, transcripts will provide the evidence required by the Admissions Committee. However, if the student's previous experience is offered as evidence, the student must provide all the documentation necessary to specify such experience. A more detailed list of the types

of pre-requisite coursework can be found on the Program's website.

Degree Requirements

The degree of Doctor of Philosophy in Infrastructure and Environmental Systems is awarded for completion of scholarly research that advances the knowledge base in the field of that research. Evidence of this is demonstrated by a successful dissertation defense. In addition, recipients of the degree should demonstrate a mastery of relevant subject matter and a potential for success in research and teaching.

As summarized below, the INES Ph.D. program requires a minimum of 72 post baccalaureate (semester) credit hours (a minor in this program is not applicable). A master's degree in an appropriate field, that is consistent with the admission requirements, may count up to 30 hours of transfer credit upon recommendation of the Program Director and upon approval by the Graduate School.

Minimum Credit Hrs. to Degree Required for Master's Entrants

INES Core. Total: 15 credit hrs.
- Core courses - 9 credit hrs.
- Case Studies - 3 credit hrs.
- Seminars - 3 credit hrs.

Specialized (Focus Area) Electives - 9 credit hrs.[1]
Directed Studies (additional courses/research) - 0 credit hrs.[1]
Dissertation Research - 18 credit hrs.
Total Credits Beyond Master's Degree - 42 credit hrs.[1]

[1] based on a maximum of 30 credit hours transferred from a master's program. Less than 30 credit hours transferred will result in a higher number of credit hours required for graduation.

Minimum Credit Hrs. to Degree Required for Bachelor's Entrants

INES Core. Total: 15 credit hrs.
- Core courses - 9 credit hrs.
- Case Studies - 3 credit hrs.
- Seminars - 3 credit hrs.

Specialized (Focus Area) Electives - 15 credit hrs.
Directed Studies (additional courses/research) - 24 credit hrs.
Dissertation Research - 18 credit hrs.
Total Credits Beyond Bachelor's Degree - 72 credit hrs.

Plan of Study

Students who enter the Ph.D. Program must prepare a plan of study before the end of fourth semester in the Program. The plan of study will propose a schedule for completion of all coursework by the student. Each plan will be approved by the program director and the student's doctoral committee.

Admission to Candidacy

After passing the qualifying examination, a student can propose a dissertation topic. A student advances to candidacy after the dissertation topic has been approved by the student's doctoral committee. Candidacy must be achieved at least 6 months before the degree is conferred.

Financial Support

The INES program offers financial support in the form of assistantships and tuition grants as described below.

Assistantships

Research and teaching assistantships are available from the INES Program on a competitive basis to qualified applicants/students.

Tuition Grants

Tuition grants including partial and full out-of-state and in-state tuition support are available on a competitive basis for out-of-state and in-state students, respectively.

Graduate Course Requirements

All courses taken for credit in the INES Ph.D. program shall be graduate level courses (6000-level and 8000-level: graduate students only), and the majority shall be at the Ph.D. level (8000-level: Ph.D. students only). Core courses, case studies courses, and seminar courses (designated INES 8XXX) and all 8000-level focus area courses will be open only to Ph.D. students. All 6000-level courses available as specialized electives will be open only to graduate students (masters and Ph.D.).

For students entering the INES Ph.D. Program who have completed a master's degree, the minimum number of hours specified below in each category will be adjusted based on the number of transfer credits awarded to the student for his/her master's work.

INES Core (courses + case studies + seminars = 15 credit hours minimum)

INES Ph.D. students will participate in interdisciplinary activities throughout their program of study. Students will begin with a set of interdisciplinary core courses that teaches them about key aspects of infrastructure and environmental systems present in all applications of INES. These common aspects are reflected in five (5) core offerings (3 core courses; 1 case study; and 1 continuous seminar). First, students will complete 2 required core courses and 1 additional core course selected from a menu of 3 other course offerings. Then, at midpoint, students will participate in an interdisciplinary case-study course, and, finally, throughout the program, students will participate in interdisciplinary seminar courses.

Focus Area (specialized) elective courses (15 credit hours minimum)

It is recognized that doctoral degree study requires advanced knowledge of issues, the breadth of which

depends on the context and objectives of the academic program. Both the infrastructure and the environment involve broad and multi-faceted issues. Beyond the core, a student needs to support doctoral research with enrollment in particular courses related to his/her research. For this reason, a minimum of 15 credit hours have been reserved for specialized (focus area) electives. The objective of these specialized electives is to provide an opportunity for students, their advisers, and the doctoral program committee to select a complementary set of specialized courses intended to focus the student's area of interest and research.

Focus area courses will come from many fields and sub-fields of various academic departments of UNC Charlotte, and they could come from the two core courses not selected as a part of the core requirement. Many acceptable courses in each focus area are currently offered in various departments at the master's level and Ph.D. levels. Selected courses must be approved by each student's adviser and by the doctoral program committee.

Focus Area 1: Infrastructure and Environmental Systems Design (INESD): The engineering, analysis, and design of infrastructure and environmental systems requires expertise in subject matter areas related to engineering principles, applications, and design methodologies. These areas include plan formulation, dimensioning of systems that could be structural and/or control systems, selection of material properties, and configuration of monitoring methodologies and approaches. Also, some basic knowledge of the causes and effects of the physical sciences as well as functional requirements of the facilities concerned needs to be provided to the student. .

Focus Area 2: Infrastructure and Environmental Systems Science (INESS): Successful development and operation of the infrastructure, including methods and approaches to managing the associated environmental and socio-economic impacts, require baseline scientific information on the nature of the ambient environment spatially and temporally. This implies that the INES student who has been exposed to critical issues and techniques in the central core is interested in environmental systems and their response to the operation of infrastructure. This INES student needs to deepen his/her knowledge in the methods of physical, chemical and biological scientific characterization of materials and other life support systems in the environment and ecosystem.

Focus Area 3: Infrastructure and Environmental Systems Management (INESM): To be able to efficiently and effectively plan and manage infrastructure system or environmental system operations, the INES students need to obtain, integrate, and utilize the knowledge in operations efficiency, effective policy development and deployment, legal issues and government regulations, intelligent support systems for decision making, effective environmental and/or socio-economic impact control measures, efficient systems project management, comprehensive evaluation of system performance, and smart systems implementation and management that includes the consideration of facility, people, policy, technology, economics, and procedures. The students who choose to focus in this area of INES will obtain the expertise in effective systems management and implementation in infrastructure system and/or environmental system areas and will work as senior managers and/or researchers in the above areas.

Directed Studies (24 credit hours minimum)
In recognition of varying backgrounds, preparation, interests, and goals, each student may complete additional credits through directed studies (courses, research, or individual study), with the consent of his/her adviser and doctoral committee. This category may include courses within a student's focus area as well as courses outside the focus area. Within the directed studies category, a student may complete a maximum of 9 credits of independent study toward the Ph.D. degree.

Dissertation Requirement (18 credit hours minimum)
The INES doctoral program includes a minimum of 18 hours of dissertation credit. The number of research credits taken each semester must be approved by the student's doctoral program committee. Each student must complete and defend a dissertation based on a research program approved by the student's doctoral adviser with concurrence by the IPC. The dissertation must be of high quality and represent an original piece of research that advances the body of knowledge in infrastructure and environmental systems. Oral presentation and successful defense of the dissertation before the student's advisory committee in a forum open to the public will be required. A copy of the student's dissertation will be made available to the graduate faculty of the program at least two weeks prior to the public defense. The dissertation must be written in a format acceptable to the Graduate School.

Student Advising

Upon acceptance into the INES Ph.D. Program, a student will be assigned an interim adviser by the Program Director. Within the first year in the Program, each student will select a permanent doctoral research adviser. This selection will be approved by the Program Director and Dean of the Graduate School. At any time a student may request a change in initial supervisor or research adviser. These requests will be submitted to the Program Director for consideration and action.

Other Requirements

Requirements for grades, transfer credits, residency, and time limits for completion match those described generally for the university. Refer to the appropriate sections of this catalogue for details.

Comprehensive (Qualifying) Examination

Each student must complete a qualifying examination. Students who enter the Ph.D. Program directly from a baccalaureate program generally will sit for this examination before the end of third post-baccalaureate year in the program; students who enter from a master's degree program must sit for it before the end of their first year in the program. To sit for this examination, a student must have completed 2 of the 3 required core courses, must have at least a 3.0 GPA, and must have removed all conditions upon admission.

The examination will be a written exam and will address issues covered by the core elements of the program, as well as any focus area material covered by the candidate up to that point. This exam will be developed and administered by each student's doctoral program committee. A student may attempt to pass the qualifying exam no more than twice. Failure a second time will result in termination of enrollment in the Ph.D. Program.

Doctoral Committee

Each student's Doctoral Program Committee will contain 5 members. One committee position will be filled by a UNC Charlotte Graduate Faculty member appointed by the Dean of the Graduate School. The remaining four members will be recommended, before the completion of the student's first year in the program, by the student's Doctoral Research Adviser, with input from the Interim Committee. Recommended faculty members should have expertise in the student's area of research interest. The Program Director will approve, with subsequent concurrence by the Dean of the Graduate School, the four recommended faculty members to serve on the Committee. The doctoral program committee of each student will be chaired by the student's Doctoral Research Adviser.

At least three of the Doctoral Program Committee members must be INES Program Faculty members. No more than three doctoral committee members can come from the same academic department, in order to reflect the interdisciplinary nature of the program. The inclusion of one member from outside the University of North Carolina Charlotte is strongly encouraged, and this person must also be a member of the UNC Charlotte Graduate Faculty.

Dissertation

The INES doctoral program includes a minimum of 18 hours of dissertation credit. Each student must complete and defend a dissertation based on a research program approved by the student's doctoral adviser with concurrence by the IPC. The dissertation must be of high quality and represent an original piece of research that advances the body of knowledge in infrastructure and environmental systems. Oral presentation and successful defense of the dissertation before the student's advisory committee in a forum open to the public will be required. A copy of the student's dissertation will be made available to the graduate faculty of the program at least two weeks prior to the public defense. The dissertation must be written in a format acceptable to the Graduate School.

Application for Degree

Each student must submit an application for degree prior to graduation and in accordance to the requirements of the Graduate School of UNC Charlotte. .

Research Opportunities

INES faculty members reside in two primary departments (Civil Engineering and Geography & Earth Science) and five supporting departments (Biology, Chemistry, Engineering Management, Architecture, and Economics). INES Faculty members in these departments currently conduct research in their specialized areas of interest as well as in inter-disciplinary areas. Every INES faculty member is qualified to serve as the doctoral adviser for Ph.D. students. Ph.D.-level research is currently being conducted in the areas of water resources engineering, water and waste water analysis and treatment, bioremediation, waste containment, contaminant transport, deep foundations, soil-structure interaction, in-situ soil assessment, composite materials, masonry structures, bridge monitoring, extreme (blast) loading, progressive collapse, material corrosion and durability, structural insulated panels, non-destructive testing, human factors in transportation engineering, traffic operations, transportation planning, and intelligent transportation systems.

Courses In Infrastructure And Environmental Systems

The INES core courses and focus area were under development and review for final curriculum approval at the time of publication of this Catalog and, therefore, are not described herein. A current version of these courses, with official course numbers, can be found on the Program's website:

http://www.uncc.edu/gradmiss/ineslindex.html
http://www.uncc.edu/ines/

INES 8090. Topics in Infrastructure and Environmental Systems. (3) Selected topics in public policy analysis. Course may be repeated for graduate credit. *(On demand)*

INES 8101. Environmental Systems. (3) Prerequisite: Admission into the INES PhD program. This course examines the principles of energy and mass transport as applied to the atmosphere, hydrosphere, lithosphere and the Earth's biogeochemical systems and how these impact human activities and infrastructure. Emerging environmental issues and technologies in the areas of environmental impact due to human activities and natural disasters, and environmental sustainability including industrial ecology, waste minimization and recycling, will also be examined. *(Fall or Spring).*

INES 8102. Infrastructure Systems. (3) Prerequisite: Admission into the INES PhD program. Overview of urban infrastructural development. Sustainable design features for facilities including municipal, transit, industrial, agricultural, telecommunications, and waste management. Impact of infrastructure development on environmental management including storm water quality and quantity, soil and channel erosion, urban air quality, sprawl, and waste production, treatment, and storage. *(Fall or Spring).*

INES 8110. Acquisition and Analysis of Scientific Data. (3) Prerequisite: Admission into the INES PhD program. The study of theories and techniques for acquiring and analyzing scientific data and information related to the analysis, design and management of the infrastructure and the environment. Includes pertinent aspects of data analysis such as statistical analysis, uncertainty, detection limits, correlation methods, trend analysis, and data management/warehousing. Includes applications of GIS and non-destructive assessment technologies to data acquisition. *(Fall or Spring).*

INES 8113. Case Study. (3) Prerequisite: INES 8101 and INES 8102. Students will work together on interdisciplinary teams to study relevant environmental and infrastructure problems presented through case studies. The intent of the course is to directly involve the students in ongoing urban community projects. *(Fall or Spring).*

INES 8690. Seminar. (1) Prerequisite: Admission into the INES PhD program. Each student will be required to actively participate in program seminars delivered by student researchers, faculty and invited speakers. These seminars will be advertised to the campus and professional communities. Participation in these seminars will count for a total of 3 credits (1 credit for each semester). Prior to graduation, each student will make at least one seminar presentation and provide at least one formal critique of a presentation in this course. Can be repeated for credit. *(Fall and/or Spring)*

INES 8890. Doctoral Independent Study and Project. (1-9) Individual investigation and exposition of results. May be repeated for graduate credit.

INES 8999. Doctoral Dissertation Research. (1-9) Each student will initiate and conduct an individual investigation culminating in the preparation and presentation of a doctoral dissertation.

INES 9999. Doctoral Residence. (1) Meets Graduate School requirement for continuous enrollment during final term prior to graduation when all course work has been completed. . Pass/no credit grading. Credit for this course does not count toward the degree.

Notes on course frequency and prerequisites:

Consent of the instructor is required on all classes in the INES Ph.D.
Some of these courses may be offered during one of the summer sessions as well as during one of the semesters. Check with summer course schedules for details.

For more information, please refer to the beginning of this section and visit the websites listed or contact the Interim Director or the Associate Interim Director as described.

MATHEMATICAL FINANCE

M.S. in Mathematical Finance

Program Office:
349 Friday Building
704-687-6219
http://www.mathfinance.uncc.edu
mathfin@email.uncc.edu

Degree

M.S.

Program Director

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Ted Amato
John Gandar
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Rob Roy McGregor
Stanislav Radchenko
Ben Russo
Jennifer Troyer
Rick Zuber

MASTER OF SCIENCE IN MATHEMATICAL FINANCE

The Master of Science in Mathematical Finance program is designed to prepare students to pursue careers in finance. Increasingly firms of all types, but especially financial institutions, investment banks, and commodities firms, rely upon highly sophisticated mathematical models to identify, measure, and manage risk. The advent of these models has triggered the emergence of a new discipline, Mathematical Finance. This new discipline, sometimes also referred to as "financial engineering," "computational finance," or "quantitative finance," requires professionals with extensive skills in both finance and mathematics.

The Mathematical Finance program at UNC Charlotte is a joint program of the Departments of Finance and Economics in the Belk College of Business Administration and the Department of Mathematics in the College of Arts and Sciences. Students take courses from all three departments in an integrated curriculum. Students may use electives to tailor the program to their specific interests.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for admission to the Master of Science in Mathematical Finance program.

1) A baccalaureate degree in a related field with a GPA of at least 2.75 out of 4.0 with an average of 3.0 in the junior and senior years.
2) Acceptable scores on each portion of the GRE, or a GMAT score of at least 600, with a minimum score of at least the 85th percentile on the math portion of the GMAT.
3) For applicants from non-English speaking countries, a language requirement score of 557 on the TOEFL or 220 on the new computer-based TOEFL or 78% on the MELAB. Non-native speakers of English, may, at the discretion of either the Graduate School or the Program Committee for the MS in Mathematical Finance, be required to enroll in English as a Second Language (ESL) courses at the English Language Training Institute.
4) Specific course work equivalent to the following: introductory course in the Theory of Finance; a standard three semester sequence in Calculus; Linear algebra; working knowledge of a suitable programming language; at least one upper-level course in Probability and Statistics. Students lacking this coursework may be admitted subject to the condition that they satisfactorily complete such coursework during the first two semesters that they are enrolled in the program and prior to their taking any program courses where prerequisites are missing.

Prerequisite Requirements

Students may enter this program from a variety of undergraduate backgrounds, including finance, mathematics, economics, computer science, actuarial science, statistics, information systems and engineering. As a result, many students admitted will not have the required background to immediately begin taking advanced courses from each of three areas of study. In such cases, the student may be required to take prerequisite courses prior to enrolling in advanced courses in specific fields. These prerequisites would be in addition to the advanced 30 semester hours required for the degree. In general students must have the following background in each field before taking advanced courses in that field:

1) Finance: Have earned an acceptable grade in an introductory course in finance from an AACSB-accredited business school at either the undergraduate or MBA level.
2) Economics: Have earned an acceptable grade in microeconomics and macroeconomics courses at either the undergraduate or MBA level.
3) Mathematics: Have earned acceptable grades in the equivalent of a three course sequence in calculus (differential and integral calculus), a course in linear algebra, and an upper-level course in probability and statistics.
4) Programming: Students should be familiar with at least one programming language, most preferably C or C++.

Again, students may be admitted to the program without meeting all of these requirements. The Program Director, in conjunction with the Departmental Graduate Coordinators, will evaluate each incoming student's academic background to determine in which prerequisite courses the student will be required to enroll. A student that meets the prerequisites in a field may begin taking advanced courses in that field while still taking prerequisite courses in another field. A student must, however, be making satisfactory progress toward fulfilling their prerequisites in all fields to remain enrolled in the program.

Degree Requirements

Total hours required:
A minimum of thirty hours of course work beyond the bachelor's degree is required to earn the degree. The student must complete the required 24 hours from the program core and 6 hours of approved electives.

The Program Core:

ECON6203/ FINN6203	Financial Economic Theory
MATH6201	Statistical Techniques in Finance
or	
ECON6218	Advanced Business & Economic Forecasting
FINN/ ECON6219	Financial Econometrics
FINN6210	Derivatives I: Financial Elements of Derivatives
FINN6211	Risk Management & Fixed Income Derivatives
MATH6202	Derivatives II: Partial Differential Equations for Finance
MATH6203	Stochastic Calculus for Finance
MATH6204	Numerical Methods for Financial Derivatives

Approved Mathematical Finance Electives:

ECON6090	Topics in Economics
ECON6100	Mathematical Economics
ECON6112	Graduate Econometrics
ECON6201	Advanced Macroeconomic Theory
ECON6202	Advanced Microeconomic Theory
ECON6235	Monetary Theory and Financial Theory
ECON6800	Directed Study Economics
FINN6058	Special Topics in Financial Services
MATH5128	Applied Probability I.
MATH5129	Applied Probability II
MATH5143	Analysis I.
MATH5171	Numerical Solution of Ordinary Differential Equations
MATH6205	Financial Computing

Any MATH/STAT6200 level course and above.

Admission to Candidacy Requirements

An Admission to Candidacy form listing graduate-level courses that apply to the degree must be submitted to the Mathematical Finance Program Director four weeks prior to the semester in which the student plans to complete the course work for the degree.

Assistantships

A number of assistantships are available each year. In order to be competitive, applications should be submitted by March 15. Additional information is available from the Program Director.

Advising

Advising is done by the Program Director, in conjunction with the Area Coordinators of each of the participating Departments.

Transfer Credit

No more than 6 credit hours and only courses with a grade of A or B at an accredited institution. Requires approval of the Program Director and the Graduate School.

Comprehensive Examination

Student will be required to pass a comprehensive examination. An examining committee will be appointed by the program director and will be constituted from the program's faculty. The exam may be, at the committee's discretion, either written or oral.

Application for Degree

An Application for Degree form must be submitted to the Graduate School by the published deadline.

Mathematical Finance Courses

Economics Courses

See descriptions of ECON courses under Economics.

Finance Courses

See descriptions of FINN courses under General Graduate Courses in Business.

Mathematics Courses

See descriptions of MATH courses under Mathematics.

Facilities And Services

THE CAMPUS

The UNC Charlotte campus is located off Harris Boulevard on NC 49 near its intersection with US 29 and only eight miles from the interchange of Interstates 85 and 77. Campus facilities are comprised of air-conditioned contemporary buildings. In addition to classrooms and well-equipped laboratories, the University offers arts and athletic facilities, cafeterias and residence accommodations. The campus is designed for the pedestrian and facilities are generally accessible to students with disabilities.

A map of the campus is included in the back of this *Catalog*. The Cato Building houses the Graduate Admissions Office and Graduate School. The Reese Building houses many administrative offices. The Registrar's Office is in the King Building.

UNC Charlotte Uptown. The University offers selected upper-division undergraduate and graduate courses and a variety of continuing personal and professional development programs at its UNC Charlotte Uptown location. Classes are scheduled for the convenience of persons employed in or living near the central business core of the city. UNC Charlotte Uptown is located at 220 North Tryon Street, on the third floor of the Mint Museum of Craft + Design. When traveling I -77, either north or south, exit onto Fifth Street. Stay on east Fifth Street until you reach Tryon Street.

Campus Transportation

City Buses: The Charlotte Transit System city bus lines serve UNC Charlotte (#29 from South Park and #39 from Uptown). Service is provided on a regular schedule connecting with established routes throughout the city. Brochures containing detailed information regarding routes, schedules and fees may be obtained in the Parking Services Office or by calling the Charlotte Transit Authority at (704) 336-3366. Fees are set by Charlotte Transit and are subject to change.

Occupational Safety and Health, Accident Prevention, and Life Safety

Occupational safety and health, accident prevention, and life safety are the concerns of the Safety and Environmental Health Office in the Department of Human Resources. It is the responsibility of this office to investigate accidents on campus, conduct safety inspections of all buildings, maintain all reports required by the N.C. Department of Labor, and generally work to reduce the risks of illness or injury in the University community. This office is located in 113 King Building.

Parking

All vehicles on campus must display a current decal or park in a visitor's parking deck or in a metered parking space. To purchase a student parking decal, students need to know the make, model, license plate number and insurance information for their automobile. Special hours for purchasing parking decals in the Cone University Center are established at the beginning of the fall and spring semesters. After these special hours end, all purchases or automobile registration changes are done directly in the Parking Services Office. Specific parking regulations are also available from this office. Decals are required the first Monday after classes start in the fall and spring semesters and on the first day of classes during both summer sessions. The Parking Services Office is located at the Auxiliary Services Building, 704-687-4285, www.uncc.edu/parking.

Police and Public Safety

The UNC Charlotte Office of Police and Public Safety is responsible for maintaining a safe and pleasant environment in which members of the University community can live and learn. Police and Public Safety services are provided 24 hours daily, seven days a week. University Police Officers are sworn, North Carolina State Certified Law Enforcement Officers. The administrative offices of Police and Public Safety are in the Facilities Management and Police Building. The Police Telecommunication Center is in the King Building. This agency is responsible for crime prevention, enforcement of laws and regulations, protection of life and property, preservation of peace, apprehension of criminals, and receipt of lost and found property.

UNC Charlotte police officers patrol the campus on foot, on bicycles, and in marked and unmarked police cars to help ensure the safety of the entire campus community. In addition to these patrol activities, the department maintains an investigative division that is responsible for conducting criminal investigations.

If a classroom, laboratory, or other life-threatening emergency were to occur, call 911 immediately. The communications division of the campus police department receives and dispatches all emergency calls. This particular division also monitors alarms around campus and handles calls from all of the campus emergency phones distributed throughout the campus that are identified with "blue lights".

Campus police officers routinely offer crime prevention and awareness workshops and they encourage requests from the campus community for these presentations. As an alternative to a presentation, copies of crime prevention and awareness materials can be obtained from the Police and Public Safety Office. More information

can be obtained online at www.police.uncc.edu/index.htm.

Recycling

As a state agency, UNC Charlotte is striving to meet North Carolina's waste reduction goals. Recycling is available to all UNC Charlotte students, faculty, and staff. Aluminum cans and plastic and glass bottles can be recycled in yellow and red containers placed both inside and outside classroom and office buildings. Cardboard, office blend (white, color & fax paper, multi-part [carbonless] forms, file folders and computer paper) and news blend (newspapers, magazines, slick brochures, catalogs, soft back books, copier paper wrappers, and chipboard [i.e. envelope boxes]) papers can be recycled in all departments on campus. Hardback books, soft-back books, batteries, videotapes, diskettes, CDs, transparencies and printer cartridges can be recycled at each department's central recycling area. All cans, bottles, newspapers, magazines, and paper bags can be recycled at the residence halls. The Recycling Office also has a food waste composting research project. Students are encouraged to utilize this program for their research projects. Dining Services offers a discount for using reusable mugs at all the campus dining locations. For more information about the Recycling Program call 704-687-2137 or go to our website www.uncc.edu/Recycling.

EDUCATIONAL SERVICES AND FACILITIES

Adult Students and Evening Services (OASES)

The Office of Adult Students and Evening Services (OASES) assists adult students in making a successful transition to UNC Charlotte. Undergraduate orientation sessions, information about the Non Traditional Student Organization (NTSO), and student newsletters are available to adult students through this office. In addition, private scholarships are awarded to adult students by the OASES program. Comprehensive student assistance is available after 5 p.m. Monday through Thursday. Evening students may consult with an academic advisor, pick up forms, publications, and make payments in OASES. Payments can be made by check, money order, or credit card (no cash) for tuition, applications, transcript requests, and other required fees. The Web Student View System is available and well trained staff members provide current, accurate information.

Office hours are Monday-Thursday, 8:00 a.m. - 7:00 p.m., Friday, 8:00 a.m. - 5:00 p.m., and Saturday 9:00 a.m. - 1:00 p.m. The office closes at 5:00 p.m. when classes are not in session. Check with the office for any special closings (typically during University holidays and breaks) each semester. OASES is located at 106 Barnard Building, (704) 687-2596. Visit www.uncc.edu/OASES for more information.

Bridge to the Doctorate (BTD)

The Bridge to the Doctorate Program, funded by a grant from the National Science Foundation, seeks to broaden the participation of underrepresented students in science, technology, engineering and mathematics (STEM). It provides tuition and fees, health insurance, and a stipend for a selected number of underrepresented students in STEM graduate programs. In addition, program participants benefit from graduate faculty mentoring, opportunities to conduct scholarly research, present their findings at professional meetings, and attend workshops.

The Charlotte 49ers Athletic Academic Center

The Athletic Academic Center (146 ATAC) provides academic and personal counseling to student athletes as a supplement to assistance provided by the Advising Center and the regular departmental advisor. Academic advisors provide prospective student-athletes with information on admission procedures and academic requirements, monitor academic progress, arrange supervised study sessions, and make referrals to other campus services.

Disability Services (DS)

The Office of Disability Services supports a culturally rich, inclusive, and accessible campus environment through education and consultation with faculty, staff, and the community on disability-related issues. The Office of Disability Services works with departments across UNC Charlotte to ensure that educational programs and campus facilities are accessible to individuals with disabilities. Disability Services counselors meet with qualified students to determine and provide reasonable accommodations that support the student's educational goals.

Assistive technology is available to students with disabilities in the Disability Services Office, centralized computer labs, the Atkins Library, and in other departments on campus. Service animals assisting individuals with disabilities are permitted in all facilities on campus. Disability Services does not provide prescriptive devices, devices of a personal nature, or personal attendant care.

Information and Technology Services

Information and Technology Services (ITS) manages the campus voice and data networks, centralized servers, University owned PCs, operating systems, and software to support teaching and learning and research and business processes. Its offices are located within the Atkins Library. The campus has a robust data network that connects over 130 servers and more than 3000 computers. Thirty percent of the campus features wireless

network access. ITS performs application development and maintains and supports the University's core administrative systems and all of the University's central server resources. ITS manages the general-use student computer labs and provides technical support to students through a walk-up facility and through an online helpdesk tool. ITS offers development, consulting, and support services to students, faculty, and staff in many areas that include the University web presence and its portal - 49er Express, the University's e-learning system that is offered through the Faculty Center for Teaching and e-Learning, and various other facilities and services that support the University's educational and research programs. Please refer to the online description of ITS offerings for more detailed information on ITS services at www.its.uncc.edu/home.

Faculty Center for Teaching and e-Learning

The Faculty Center for Teaching and e-Learning (FCTeL) was created as a faculty support center and is charged with the responsibility of providing assistance and resources in the arenas of pedagogy and instructional technology as described on its website, www.fctel.uncc.edu. Faculty are encouraged to use FCTeL's resource materials, work on extended projects, participate in a variety of workshops, work with staff consultants, be involved in development activities, and utilize computers, multimedia equipment, and other technologies in the Faculty Technology Lab.

Library

The J. Murrey Atkins Library is located near the center of the campus and houses a collection that includes nearly one million bound volumes and extensive microform collections. The Library of Congress classification system is used for the arrangement of books and periodicals and an online catalog provides access to a substantial portion of the collection. Atkins Library meets the informational needs of the University community by offering a variety of services. Library staff assist users in locating information and in utilizing library services. The library offers general orientation tours during the fall semester. The reference staff offers an active library instruction program, which includes customized presentations and resource guides and instruction sheets on locating and using library resources. The Library's website, www.library.uncc.edu, offers additional information about its resources and services.

The Library offers state-of-the-art electronic access to local and worldwide resources. The Library's online catalog provides access to print and non-print resources that are located within the Library or at other locations. Networked multitasking computers with high speed printing and download capabilities provide electronic access to local research databases, electronic journals, full-text articles, and Internet connections to the world including NC Live, the North Carolina electronic initiative with access to thousands of databases. Web-based access to Library electronic research materials is also available from other locations on- and off- campus, if license agreements permit.

A number of special collections are available. A selective depository of U.S. publications since 1964, Atkins Library has over 958,800 federal government documents including statistics, bibliographies and full text files on compact discs. The North Carolina documents collection, begun in 1976, is a rapidly growing collection of publications of state government agencies; the library was designated one of the first depositories for North Carolina documents in 1988. The Local Public Documents Room Collection for the McGuire Nuclear Plant on Lake Norman is located in the Library. Atkins Library also houses a growing collection of over 53,053 maps, ranging from USGS topographic quadrangles to historic WWII-era Defense Mapping Agency maps.

The Mary and Harry L. Dalton Rare Book and Manuscript Room houses collections of rare books, historical manuscripts, local government documents, and official University records. The 6,754 volume Rare Book Collection specializes in American literature, historical children's books, and English drama. The Manuscript Collections contain over one million unpublished papers, photographs, and architectural drawings relating to the history of Charlotte-Mecklenburg and surrounding counties, while the Local Documents Collection emphasizes printed materials issued by governmental bodies in the region. The University Archives and Records Management Program provides information support services for current University operations and preserves approximately one million items that document the history of the university.

Presentation Support Services

Presentation Support Services is located within the Information Commons of the J. Murrey Atkins Library. Faculty and students can obtain instructional assistance that includes consultation for multimedia development, web page development, graphic design, and instructional design. Digital imaging services, video and audio duplication, international video tape conversion, video tape editing (both analog and digital), scanning, slide duplication, and creating original illustration for websites and publications are also available.

The Office of Building Educational Strengths and Talents (B.E.S.T.)

B.E.S.T. is a federally funded community that provides intensive academic and post-baccalaureate advising, tutorial assistance, and exposure to diverse cultural opportunities to first-generation college students, as well as other select populations with lower retention and graduation rates.

Office of International Programs

The Office of International Programs (OIP) serves as a focal point for UNC Charlotte's international dimension by providing leadership and assistance in the areas of

curriculum development, international student/scholar services, education abroad, overseas linkages, English language instruction, cross-cultural training, and community offerings.

Education Abroad
UNC Charlotte encourages its students to study and live abroad as a part of their university career. The Office of Education Abroad offers students the opportunity to study or work abroad for a year, a semester, or a summer. Programs are available in countries throughout the world. Deadlines for application for fall semester or year-long programs are in January, deadlines for spring semester programs are in September, and deadlines for summer programs are generally in March or April. More information about Education Abroad programs is available online at www.uncc.edu/edabroad.

Faculty Development
The Office of International Programs serves as a facilitator for faculty exchange opportunities. Faculty are encouraged to work with the OIP staff in exploring and applying for a wide range of international exchanges. Among these are the Fulbright Exchange Program, reciprocal department exchanges, and exchanges based on agreements between UNC Charlotte and overseas institutions of higher learning. Faculty and administrators also are able to take advantage of OIP's professional development program. This program provides opportunities for the further enhancement of international interests through travel for international study and research and faculty colloquia on international topics.

International Student/Scholar Services
These services are designed to address the needs of foreign students and scholars in the areas of immigration, campus and community orientation, and cultural adjustment. The staff serves as a liaison to other campus offices on related matters and provides programs that enhance the student and scholar's learning experience including International Conversation Partners, The Host Family Program, International Coffee Hour, advising of international student clubs, and cross-cultural training workshops.

Campus Programming
Various events are sponsored independently and in cooperation with other departments and agencies. They include the annual International Festival, dinners featuring specific cultures, the Education Abroad Fair, Summer Institutes, and the Chapter office of Phi Beta Delta Honor Society for International Scholars.

The English Language Training Institute (ELTI))
The Institute provides intensive English as a Second Language instruction for international students planning to attend American universities or colleges. ELTI holds three sessions per year--fall, spring, and summer--and offers up to seven language proficiency levels. Average class size is 12 students and students attend classes 20-24 hours per week. Exceptional students in Levels 6 and 7 are eligible to take University courses in addition to their English classes. ELTI also offers English language assessment and a communications course for international teaching assistants and language consulting for international faculty at UNC Charlotte.

Public Service
The OIP seeks to initiate and respond to the international needs and interests of the community. Current programs are as follows: 1) *Community Forums* - symposia on topics of current international interest, 2) *Great Decisions* - an annual series of lecture/discussions during the months of February and March on eight key policy issues, 3) *Cross-Cultural Training* – individually designed workshops that focus on appreciation of other cultures and development of effective communication skills across cultures, and 4) *Intercultural Outreach Programs* - offers custom designed, short term training programs for international groups. These programs may include English language training, American cultural themes, and/or specialized professional development in any field, site visits and internships in the community, and a variety of cultural experiences tailored to meet the objectives of the group.

Office of the Vice Chancellor for Research and Federal Relations

The Office of the Vice Chancellor for Research and Federal Relations provides direction and leadership for the development of research and creative activity at the University and the infrastructure that supports those activities. The Vice Chancellor coordinates federal and congressional relations and oversees four support offices, the Office of Proposal Development, the Office of Research Services, the Office of Technology Transfer, and the University Vivarium. The President of the Ben Craig Center also reports to the Vice Chancellor.

The Office of Proposal Development (OPD) works closely with faculty and funding agencies to identify opportunities for proposal development, facilitate the formation of proposal teams, and provide a wide range of services to help faculty achieve their research goals, including identification of funding sources, general consultation on writing and funding strategies, and proposal editing.

The Office of Research Services (ORS) provides services for the review and submission of proposals to funding agencies that include the interpretation of guidelines, preparation of budgets, and mailing and tracking of proposals as well as post-award management support. ORS coordinates research-support efforts with college research officers and is responsible for federal compliance.

The Office of Technology Transfer (OTT) provides services for the review, protection, and management of University-based intellectual property and commercializes

intellectual property through licensing services. OTT builds and maintains strategic partnerships with local and state-based economic development agencies and assists and mentors faculty and students with new business start-ups. OTT provides outreach services in the areas of entrepreneurship, new business creation, intellectual property management, and venture capital financing. OTT also acts as the primary conduit to industry for sponsored research and technology commercialization.

Producing Readiness of Diverse University Cohorts in Education (PRODUCE)

UNC Charlotte is one of the eight schools in the University of North Carolina system that has received a Louis Stokes Alliance for Minority Participation (LSAMP) National Science Foundation Grant to (1) improve the quality of the learning environment for underrepresented students in science, mathematics, engineering and engineering technology; (2) increase the number of underrepresented students graduating with degrees in science, mathematics, engineering and engineering technology; and (3) develop and implement effective techniques of attracting talented underrepresented students who would otherwise not choose science or engineering as a career. PRODUCE participants receive faculty and peer mentoring, peer tutoring, opportunities to attend professional meetings/conference, internships, and scholarships.

Ronald E. McNair Post-Baccalaureate Achievement Program

This federally supported program is designed to increase the number of low-income and first-generation college students who earn doctoral degrees and teach in colleges and universities. Participants are usually juniors and seniors who work with faculty mentors on research projects and attend other scholarly activities related to pursuing a graduate education. The intent of the program is to introduce students to the rigors of graduate study.

Structured Study Groups (SSG)

SSG is a study system in which students from the same class work together in small groups of 4-6 members to reinforce material presented in class. The University Center for Academic Excellence (UCAE) assists students in forming SSGs with the support of faculty. SSG encourages students to collaborate on common classroom tasks for deeper understanding of course material. The goal of the SSG is to have each student commit to the "pursuit and ownership" of learning.

Student Employment Office

The Student Employment Office assists students in locating work on campus. The University participates in the federal Work-Study Program and attempts to match students with jobs related to their academic interests. Students are encouraged to limit employment hours to allow for success in a full 15-18 hour course load each semester. This office is located in the King Building.

Supplemental Instruction (SI)

Supplemental Instruction assists students in historically difficult courses that include biology, chemistry, physics, communication studies, engineering, mathematics, and business. In regularly scheduled group study sessions, trained SI Leaders help students refine the unique skills necessary for doing well in the target course. Students regularly participating in SI average one-half letter grade or higher on final course grades than non-participants.

Transfer Resources for Advancing the College Experience (TRACE)

TRACE assists transfer students from underrepresented populations in making a smooth transition into UNC Charlotte by identifying campus resources, providing academic support, and acting as advocates. The TRACE program provides services related to orientation, retention, career advisement, academic advising, and learning assistance.

Tutorial Services (TS)

Well-trained undergraduate and graduate students provide free tutoring to University students in a variety of disciplines. Tutoring is primarily in mathematics, sciences, business, and foreign languages. Tutoring services emphasize both content mastery and learning skills development. Tutors are selected based on their competence in the subject area and their effective interpersonal skills. The Tutorial Services program at UNC Charlotte is nationally certified through the College Reading and Learning Association, Level II.

University Career Center (UCC)

The University Career Center (UCC) offers comprehensive career services designed to assist undergraduate and graduate students in all stages of career development: career decision making, career planning, career employment, and reassessment. Experiential learning is a key component and all students are encouraged to take advantage of internship, cooperative education, 49ership, and other career exploration programs. With the UCC acting as a coordinating and academic support unit for experiential learning, over 64 percent of all students at UNC Charlotte participate in a University-sanctioned career-related experience. The University Career Center is in the Atkins Building, 704-687-2231, www.career.uncc.edu, (E-mail) career@email.uncc.edu.

Services provided by the Center range from individual counseling on career transitions/changes, job search consultation, and videotaped mock interviews to small group workshops on resume writing, interviewing techniques, uncovering the hidden job market, and transition to the world of work. Other services include on-campus interviewing, a career resource collection, job and career exploration fairs, and other special career programs. The UCC website, www.career.uncc.edu,

provides additional career services information including a Career Planning Guide. Students are encouraged to visit the University Career Center during their first semester at UNC Charlotte.

University Center for Academic Excellence (UCAE)

The mission of the University Center for Academic Excellence (UCAE) is to improve student academic performance and foster meaningful learning experiences. The UCAE (www.ucae.uncc.edu) provides services, programs, and materials to help students develop and refine thinking skills, utilize learning and self-management skills, and learn course material more quickly and thoroughly while earning higher grades. Services include: (1) individual consultation regarding academic concerns; (2) diagnostic assessment of learning styles and study habits/attitudes; (3) computer-assisted instruction for a variety of course subjects; (4) "Study Smarter" workshops; and (5) a library of materials with books, DVDs, video tapes, and printed handouts outlining successful study/learning strategies.

Writing Project (WP)

As part of the National Writing Project, the UNC Charlotte Writing Project has been providing a place for teachers to come together to share experiences of teaching writing and to learn how to better teach writing since 1979. Through a variety of systematic and ongoing professional development programs, the NWP provides a place for teachers of all disciplines and all grade levels to participate in the widely acclaimed NWP where teachers teach teachers. The WP website is www.education.uncc.edu/wp.

Writing Resources Center (WRC)

The Writing Resources Center (WRC) provides a free tutorial service for all UNC Charlotte students who want to become more effective writers. Students who come to the center work one-on-one with graduate and undergraduate tutors on any part of the writing process -- planning drafting, focusing, organizing, revising, or editing. Tutors help students understand writing processes and learn strategies for writing successful papers at all levels and for all disciplines. WRC services include one-on-one tutoring, small group tutoring, student referrals, classroom workshops, small group workshops, library assistance, and on-line tutoring. Computer-assisted grammar instruction, handbooks and professional writing texts, and a limited number of PCs are available for student use in writing papers. The WRC website is www.uncc.edu/writing/wrcindex.html.

Chimney Rock Park Field Station

The Station is located in the Blue Ridge Mountains, 30 miles southeast of Asheville. The University has an agreement with Chimney Rock Park to investigate the biological, geological, and cultural features of the 800 acre park. The study area extends from the Broad River at the bottom of Hickory Nut Gorge to the top, a vertical climb of over 1,500 feet.

UNC Charlotte Experimental Ecological Reserve

The Reserve is a 100 acre tract of land set aside on campus by the UNC Charlotte Board of Trustees as a permanent ecological reserve for use as an outdoor classroom and laboratory. The reserve includes a floodplain forest, pine stands, mixed pine hardwood forest, and a relatively undisturbed 10 acre watershed of oak-hickory forest.

UNC Charlotte Rocky River Wildlife Refuge

The Refuge is a 46 acre natural area located east of Charlotte in Stanly County. Its purpose is to preserve the natural features of the area and allow research and field trips to study the plants and animals within the North Carolina slate belt formation.

UNC Charlotte Botanical Gardens

The Gardens, located on campus, consist of the McMillan Academic Greenhouse, the Van Landingham Rhododendron Glen, and the Susie Harwood Ornamentals Garden. Begun in 1966, these gardens combine indoor and outdoor facilities for teaching, research, and public display of a wide variety of native and exotic plants. The outdoor gardens are open seven days a week and the greenhouses are open Monday through Saturday. Students and the public are invited to visit free of charge. More information can be found online at http://gardens.uncc.edu.

STUDENT ACTIVITIES

Students at UNC Charlotte are encouraged to participate in extracurricular activities. The Student Government Association, the Campus Activities Board, and Student Media are a few of the available activities that can play a significant role in each student's development and total education. The Graduate and Professional Student Government and its registered graduate program groups serve the interests of the graduate student population. Participation in activities, ranging in type from service and religious to athletic and social, and from creative arts and crafts to wilderness experiences, increases a student's opportunities to acquire leadership skills, to experience the responsibilities involved in functioning within a self governmental process, and to develop personal talents and interests.

Students are entitled to participate in several student groups and organizations as long as they are academically eligible to continue their enrollment. However, participation in organizations associated with the above groups requires students to be in good standing with the University, both

academically and in accordance with The Code of Student Responsibility (located at the back of this *Catalog*).

Athletics

The Charlotte 49ers Department of Athletics provides competition in 16 intercollegiate varsity sports for men and women. Each sport competes under the governing powers of the National Collegiate Athletic Association (NCAA) at the Division I level, which is the highest competitive level for collegiate varsity sports. Scholarships are available for all varsity sports, male and female. The website is charlotte49ers.collegesports.com/.

Male student-athletes compete in eight sports: baseball, basketball, cross-country, golf, soccer, tennis, indoor track and field, and outdoor track and field. Female student-athletes also compete in eight sports: basketball, cross-country, soccer, softball, tennis, volleyball, indoor track and field, and outdoor track and field.

The Charlotte 49ers recently joined the Atlantic 10 Conference with play in the league beginning in 2005-06. The Atlantic 10 sponsors championships in each of the 49ers' 16 sports. The Atlantic 10 is made up of 14 schools: UNC Charlotte, University of Dayton, Duquesne University, Fordham University, George Washington University, La Salle University, University of Massachusetts, University of Rhode Island, University of Richmond, St. Bonaventure University, Saint Joseph's University, Saint Louis University, Temple University, and Xavier University. Atlantic 10 tournament champions in baseball, men's and women's basketball, golf, men's and women's soccer, softball, men's and women's tennis and volleyball receive automatic bids to the NCAA post-season tournaments.

Each of the 49ers teams, except golf and cross-country, competes on campus in home competition. The basketball and volleyball teams compete in Halton Arena, the soccer and track and field programs compete at the Irwin Belk Center, while the baseball, softball and tennis teams compete at the D.L. Phillips Athletic Complex.

IMPORTANT: UNC Charlotte students have free admission to all regular-season home athletic contests with proper University identification.

Campus Activities Board

Campus activities board is the largest student programming organization on campus and is responsible for planning diverse, quality events for the university community. CAB offers over 100 programs a year and works to enhance and unify the university community by planning social, cultural, educational and recreational events that complement the university's academic mission. Founded early in the history of UNC Charlotte, CAB maintains a vital role in fostering 49er spirit and traditions through popular programs such as Week of Welcome, Week of Madness, Homecoming and more. Opportunities for student involvement include the Live Entertainment, Special Programs, Talks and Topics, Cone Connections, Feature Films, Spirits and Traditions, etc. See the CAB website, www.uncc.edu/cab/, for more information on the types of activities and how to get involved. The CAB Office is in the Cone Center, 3rd Floor, (704) 687- 2450.

Center for Leadership Development

The UNC Charlotte Center for Leadership Development provides students with opportunities to develop leadership skills and abilities and provides the University and student organizations more effective leadership resources. The goal is to provide a comprehensive and diverse program of leadership development activities for current student leaders and potential leaders. The program consists of group and self-paced leadership components, retreats and conferences, as well as academic courses. Individual and group consultation is also available. Contact the Center for Leadership Development for more information on the many Center programs offered throughout the year at (704) 687-2703 or online at leadership.uncc.edu.

Dean of Students Office (DSO)

The Dean of Students Office serves all students. The Dean of Students Office (DSO) is a department within the Division of Student Affairs and serves as a key link between students and other areas of campus life. The DSO is responsible for student government, fraternities and sororities, minority student support services, new student orientation, off-campus student services, women's programs, judicial programs and volunteer services. Each of the above services provides excellent opportunities for students to incorporate classroom knowledge into practical situations. Students often find themselves learning new skills and abilities that will help them become more productive and more responsible citizens.

The staff of student development professionals provides support for any student who has a grievance or concern about the University. The office also coordinates and assists with the settlement of academic and social misconduct charges against individuals and student organizations. The DSO also is charged with ensuring that the Code of Student Responsibility and the Code of Academic Integrity are followed. The purpose of discipline in a University setting is to maintain a campus community conducive to a positive learning environment. Consistent with this purpose, intentional efforts are made to foster the personal and social development of those students who are held accountable for behavior inconsistent with University expectations, both in and out of the classroom. All UNC Charlotte students are expected to be familiar with their rights and responsibilities as outlined in The Code of Student Responsibility and The Code of Academic Integrity. When students are allegedly in violation of the Codes, they are held accountable through the judicial processes.

The Dean of Students Office is located in 217 King Building. For information, call 704-687-2375 or visit the DSO website, www.dso.uncc.edu.

Honorary Organizations

There are a number of national/international honor societies that have chapters at UNC Charlotte. Further information on each organization is available from the department or college offering the discipline.

Intramural and Recreational Services

The Intramural and Recreational Services Office (www.recservices.uncc.edu) develops and conducts programs that provide opportunities for University students and faculty/staff members to participate in recreational activities. Intramural tournaments and events are scheduled throughout the year for individual, dual, and team participation. The tournaments and events are organized to provide separate competition among coeducational, men's, and women's teams. Sport clubs provide an opportunity to participate in a single sport on a continuing basis. Approximately thirty clubs, ranging from martial arts to lacrosse to paintball, are active each semester. Fitness and Wellness opportunities include group fitness, mind/body classes and personal training. In addition to structured sports programs, the division promotes the concept of informal recreational use of athletic facilities through the Open Recreation Program.

Multicultural Resource Center

The Multicultural Resource Center (MRC) offers opportunities for students, faculty, and staff to learn about a diversity of issues relating to global differences while providing an environment for specific populations to meet and socialize with others. In addition, the staff support the efforts of students to establish organizations that build awareness of and celebrate diversity and promote community.

The MRC provides the University community with non-mainstream diversity resources including books, newspapers, journals, videos, magazines, training materials, and games. The Center also provides a resource area, with conference room, computer stations and internet access to aid multicultural organizations without dedicated office or meeting space. Special programs supported by the MRC include the annual International Festival, Martin Luther King, Jr. Celebration, Cultural Heritage Celebration Weeks, as well as other special events. Several multi-cultural student organizations are advised out of the MRC, including Black Student Union and Caribbean Connections.

Black Student Union (BSU) is an organization designed to raise cultural awareness and address issues facing the African-American student community. Some of its sponsored activities include the annual Halloween Carnival, the annual Step Shows, the Housekeeper's Appreciation Day, and an annual Awards Banquet. This organization also produces a student-run publication, "The Black Perspective," for the articulation of the voices of African-American students. Students interested in these types of events should contact the BSU office at (704) 687-2191. Membership is open to all students.

Martin Luther King Celebration Committee is a committee of students, faculty, and staff working together to produce a campus-wide celebration

Cultural Heritage Weeks are celebrations and education of cultures represented by UNC Charlotte students. Staff support the efforts of these student organizations to educate the university community about these cultures through a variety of workshops, presentations, displays and celebrations.

The Multicultural Resource Center is located in the Cone Center, 3rd Floor. For information, please call (704) 687-3856 or visit online at http://mrc.uncc.edu.

Non-Traditional Student Organization

The Non-Traditional Student Organization (NTSO) is a student government and OASES-funded support group for adult students. For more information and membership forms, contact the Office of Adult Students and Evening Services (OASES) in 106 Barnard Building, (704) 687-2596. The NTSO phone number is (704) 687-2447, http://www.uncc.edu/ntso, e-mail address: ntso@email.uncc.edu.

Student Activity Facilities

The James H. Barnhardt Student Activity Center (SAC) provides a number of activity options for UNC Charlotte students and their guests. The SAC offers an expansive Food Court, an array of recreational facilities that include video games, billiards, table tennis, and a well-equipped campus fitness center. The third floor of the SAC contains meeting rooms and the SAC's Salons, which may be reserved for various functions. In addition, there are several quiet areas for relaxing and studying. From the lower level, students and guests may access the SAC recreational courts, indoor jogging track, and climbing wall, which are located inside the multi-functional Dale Halton Arena with a seating capacity of 9,106 patrons. The arena is utilized for volleyball, basketball, and concerts, as well as other large events. The Belk Gymnasium offers recreational facilities as well. Inside the Belk are three recreational courts, a mini-gym, badminton, squash, racquetball, volleyball courts, and an indoor pool.

All currently enrolled students may utilize the SAC fitness center and recreational courts as well as the Belk Gymnasium facilities at no cost. Students may also bring up to two guests to enjoy the fitness facilities, for a small fee. Reservations are not required, but the fees must be paid upon entering the fitness areas. The Game Room is accessible to non-students as well. Because the Barnhardt Student Activity Center and the Belk Gymnasium are

multi-purpose facilities, part or all of the courts may be closed for special events. For additional information on the SAC and Belk Gymnasium guest policy, please call 704-687-4802.

Student Body Government

At the UNC Charlotte, the undergraduate students are represented by the Student Government Association (www.uncc.edu/sga/) and the graduate and professional students are represented by the Graduate and Professional Student Government (www.uncc.edu/gpsg/). Participation provides students an early experience in governmental affairs. More information about each student government group may be found at the groups' websites. Students often find their work in student government a useful background for later public service. The University encourages student participation in its affairs and has student representatives on many of the faculty and administrative committees. The leaders of student government are committed to representing the student body and to developing students' awareness of the many facets of life at their University. All regularly enrolled students, whether on a part or full time basis, are eligible to participate in student government.

Student Media Productions

The Student Media Board is the governing body for Student Media. It is comprised of students and administrative staff members, as well as representatives of the various student media. *The University Times* is the campus newspaper, published every Tuesday and Thursday, and offers campus news and journalism experience for students. The newspaper provides a vital service to the entire University community by keeping readers informed of issues of common concern and interest. Family members may keep informed with the University's news by calling (704) 687-2663 and ordering a subscription to The University Times.

NinerOnline.com is the university community's home in cyberspace. UNCC news, sports, and feature stories are posted several times each week. Students can sign-up to have the headlines emailed to them throughout the week or anytime breaking news is happening. Students gain experience with internet publishing and writing by working with NinerOnline. Visit the site at www.nineronline.com.

Media Marketing is the sales and promotions branch of Student Media. The department solicits advertising and coordinates promotion for UNC Charlotte's student publications. Media Marketing offers real world experience and internship opportunities for business, marketing, and communication careers.

Sanskrit is the nationally recognized literary magazine published by students interested in the arts. Original work in writing, drawing, photography, and other arts is welcomed by the editor. Submissions are professionally juried and selections are published in the annual edition of the magazine.

Internships are available in Student Media. Interns can earn academic credit and receive "hands on" media experience in writing, design, photography, advertising, desktop publishing, and management.

For more information about how to get involved with the student media, contact the office at (704) 687-2663, 175 Cone Center, or visit online at media.uncc.edu.

Student Organizations

The University has over 225 student organizations that help meet the academic, social, political, and religious needs of UNC Charlotte students. There are many benefits to joining a student organization, including making new friends, developing new skills and abilities, working as part of a team, learning to set and achieve goals, sharing your time and talents, as well as having fun. The Office of Student Activities encourages you to enhance your education at UNC Charlotte by becoming involved and has a staff member who works directly to support student organizations. Contact the Student Government Office at 704-687-4606 in the Cone University Center for a listing of the clubs and organizations registered by the Student Government Association and phone the Graduate and Professional Student Government Office at 704-687-3231 for the registered graduate organizations.

VENTURE Outdoor Experiences

VENTURE offers experiential learning, non-credit courses and workshops in outdoor settings. Activities include weekend trips in a variety of outdoor sports from backpacking to kayaking, and programs at our on-campus team development course, high ropes team challenge course, and indoor climbing wall. Venture programs are modeled on Outward Bound and are designed to facilitate individual growth through physical challenge, group interaction, and personal reflection. VOLTAGE (Venture Outdoor Leadership Training and Group Experience) trains student leaders to instruct Venture Programs. Venture houses a resource library to help individuals plan their own trips. Outdoor camping gear can be rented.

Venture also offers courses for academic credit through the Department of Kinesiology. Each fall, a four-credit course, Wilderness Experience, offers an adapted Outward Bound experience presenting a series of increasing challenges. A variety of one-credit outdoor activity courses also is offered. For additional details, see the descriptions for KNES courses or contact the Venture Program (704-687-2486) in the Cone Center.

STUDENT AFFAIRS AND SERVICES

The University of North Carolina at Charlotte provides a comfortable and enjoyable environment for students that is conducive to study. The services, facilities, and programs of the University promote individual student development and foster a community that promotes the involvement of students in their intellectual, cultural, spiritual, emotional, and physical development.

49er Account

Funds deposited into a 49er Account can be used anywhere on the UNC Charlotte campus where the 49er Account is accepted for payment of purchases. Currently, the 49er Account is accepted at all Dining Services locations, the UNC Charlotte campus bookstore, campus Copy Center, campus copiers, computer print labs, campus vending machines, residential laundries, the Cone University Center Candy Shoppe, and the Student Activity Center Game Room. Deposits to the 49er Account can be made at the 49er Card Office in the Auxiliary Services Bldg., Room 148, at the Dining Services/ID Office located in the Cone University Center or at any of the four Value Transfer Stations (VTS's) located on campus at the Residence Dining Hall, Barnard Computer Lab and Atkins Library 1st and 2nd floors. 704-687-2138. Website: www.uncc.edu/auxsrvcs/.

Bonnie E. Cone University Center

Cone Center serves as the hub of activity for informal gatherings and social activities on campus and provides an attractive, comfortable place for relaxation and study. A variety of activities, including concerts, movies, lectures, and banquets are offered to students and the campus community. Services and facilities include several meeting rooms and multi-purpose spaces, art galleries, the information desk and music listening/TV lounge, the Candy Shoppe, Creation Station (signs, banners, balloons, etc.), Campus Event Information Office, Technical Services, and Conferences/Reservations and Events Services.

Student service offices in the Center include: The Office of Student Activities, Center for Leadership Development, Multicultural Resource Center, Campus Activities Board, Student Government Association, Student Media, Student Organization Offices/Mailboxes, and the Student Activity Fees Commission. The Black Student Union, Resident Student Association, and Graduate and Professional Student Government Offices are also in the Cone Center.

Additional services include the I.D. Office, Main Street Market Food Court, ATM machines, computing stations, wireless network access, and lounge spaces. Please stop by the Cone Center Administrative Offices in the 380 Suite for more information or to get involved with our programs.

The I.D. Office is co-located with the Dining Services Office adjacent to the Main Street Market Food Court in Cone University Center. It is open from 8 a.m. to 5 p.m., Monday through Friday. **After Hours** (Cone Center) and **The Rathskeller** (Residence Hall Cafeteria) can be reserved for dances and other events. The Campus Activities Board (CAB) and Campus Programs offer a wide variety of entertainment, including name musical and novelty acts, lectures, movies, minority programs, women's programs, and children's programs.

Bookstore

The University Bookstore offers new and used textbooks, non required special interest and gift books, school supplies, computer software, greeting cards, gifts, and insignia clothing items. Services include "pre-packs of textbooks" specially designed for freshmen and special ordering of books not carried in stock.

Counseling Center

The Counseling Center at UNC Charlotte supports the academic, career, personal, and interpersonal development of UNC Charlotte students by providing short-term individual and group counseling, consultation for faculty, staff, parents, and students, and educational programs to the campus community. In addition, the Center promotes a healthy university community by offering short-term consultation with faculty and staff for personal and work-related issues. Consistent with the academic mission of the University, the Center also serves as a training site for graduate students in psychology and counseling and encourages scholarly activity and professional development of staff.

Initial counseling appointments may be arranged in Room 158 of the Atkins Building or by calling the Center at 704-687-2105. Information between student clients and counselors is confidential in accordance with guidelines established by the American Psychological Association and the laws of the state of North Carolina. All currently enrolled students are eligible for an initial assessment. This first session helps both the student and counselor decide how Counseling Center services might best serve a student's needs. These services may consist of individual or group counseling at the Counseling Center or a referral to an on-campus or off-campus service.

Counseling is provided to help a person cope with difficult situations and conflicts; improve interpersonal relationships; adjust to college and other life transitions; and overcome specific psychological difficulties such as depression, anxiety, eating disorders, and substance abuse. Groups are offered each semester, some of which are short-term structured groups that address a particular theme (such as anxiety reduction). Other groups are on-going and unstructured.

Outreach and consultation are important services provided by the Counseling Center. Staff members are available to consult with faculty, staff, parents, and students on topics such as enhancing communication, improving the learning environment, and helping a particular student with a problem. Outreach activities; usually focusing on some aspect of personal, interpersonal, or group development; include programs conducted outside the Counseling Center to meet the needs of a group or organization.

More information about the Counseling Center and its services can be obtained by visiting the web site at www.counselingcenter.uncc.edu or by calling 704-687-2105.

Dining Services

UNC Charlotte Dining Services provides a variety of options for the campus community that offer an array of service styles, food choices, and methods of payment. Restaurants are located conveniently around campus. There are two resident dining facilities, RDH and Crossroads Café, with an all-you-can-eat format, two a la carte facilities, Prospector Café and Main Street Market, and national brands Chick-fil-A, Burger King, and Pizza Hut. In addition, there are two campus convenience stores, 49er Express and Crossroads Market. All campus restaurants and convenience stores accept cash, declining balance, and 49er accounts.

Health Services

Student Health Services provides primary medical care; disease prevention; health education; wellness promotion; and various specialty services including allergy injections, immunizations, gynecology, physical therapy, and HIV screening to all registered UNC Charlotte students. Student Health Services is staffed by a team of physicians, physician assistants, nurse practitioners, registered nurses, pharmacists, physical therapists, radiology technologists, medical lab technicians, health educators, and certified substance abuse counselors, and is accredited by the Joint Commission on Accreditation of Healthcare Organizations.

Services are available as follows:

- Fall & Spring Semesters: Monday-Thursday 8:00 am to 8:00 pm, Fridays 8:00 am to 5:00 pm.
- Summer and Intersession: Monday-Friday 8:00 am to 5:00 pm.
- The center operates scheduled hours and follows the University holiday and hazardous weather policies.

Appointments are recommended in order to eliminate long waits and assist students in scheduling medical services around class schedules. Seriously ill students and emergencies are referred to local hospitals or other appropriate medical facilities.

Beginning Fall Semester 2005, all students are required to either demonstrate proof of insurance or to purchase a Student Health Insurance Plan through UNC Charlotte Student Health Services. Full details may be found at www.uncc.edu/health_svcs.

The student health fee covers most of the cost for services; however, additional fees are charged for x-ray, pharmacy, laboratory, and gynecology services. Fees for service may be paid by cash, check or transferred to the student's University account. Fees are subject to change. For more information, visit www.uncc.edu/health_svcs or call (704) 687-4617.

Housing and Residence Life

The Department of Housing and Residence Life offers students a variety of living arrangements including Graduate/Nontraditional Student Housing in apartments. Please refer to the Housing and Residence Life website at www.housing.uncc.edu/. Hunt Village offers a quiet area that is conducive to the lifestyle of graduate students. Hunt Village apartments have four one-person bedrooms, a bath, living/dining area and kitchen. Kitchens include stoves and full-size refrigerators.

Apartment furnishings include a single bed, under-the-bed dresser, desk, chair, and cable TV/high speed Internet connections for each bedroom. Living areas include a couch and dining table and chairs. All apartments have window blinds and are air-conditioned. Other amenities include basic cable television, the Miner Movie channel featuring current movie titles and Time Warner's "Road Runner" high-speed cable modem Internet service. Local telephone service, which includes voice mail, is provided to all residents. Several options are also available for summer housing. For information, contact the Department of Housing and Residence Life.

Students who plan to live on campus should apply as soon as possible as space is limited. An application for housing will be sent to the entering student who requests one following his or her final admission to the University. A $100 deposit is required when the application is returned to the Associate Vice Chancellor and Director of Housing and Residence Life.

Housing facilities designed specifically for students in wheelchairs are available. Wheelchair students who receive confirmation of residential space have priority in assignment to these facilities *as long as the University is able to offer space.* It is extremely important that the housing application is received before all space is committed so that this priority for assignment to appropriate facilities can be exercised. Wheelchair students may be considered for priority status on the waiting list on the basis of 1) the date of application and 2) the degree of utilization of wheelchair-

equipped facilities as compared to the proportion of wheelchair students who apply.

Assignment to a wheelchair-accessible housing space, requires documentation of the disability and special needs in accommodations by the Disability Services Office. Documentation must be provided to Disability Services when the housing application is submitted and no later than June 1.

The University does not assume any responsibility for the provision of attendants for students with disabilities. Such arrangements are entirely the responsibility of the individual student and should be established well in advance of the time the services are to begin.

Office of Religious Affairs (ORA)

As a tax supported public institution, UNC Charlotte neither promotes nor recommends any religious orientation. However, the University recognizes that spiritual discernment and moral appreciation are essential to the development of the whole person and has established the Office of Religious Affairs. *The Office of Religious Affairs* serves as a liaison for faith related matters within the University community. ORA assists in directing new and existing registered religious organizations and campus ministers (or equivalent) through University procedures and processes.

The Inter-Religious Council (IRC), sponsored by the Office of Religious Affairs, is comprised of any interested persons in the University community and encourages each faith or group to conduct religious activities in its own name, according to its theological principles and practices. The goal of the IRC is to develop a cooperative and non-threatening environment of understanding, mutual respect, and meaningful interaction between all faith groups on campus. The IRC holds monthly lunch discussions on faith-related topics that are open to all interested individuals on campus. In addition, the IRC has at least one activity or event each semester that promotes camaraderie among IRC members, which will benefit the university or the larger community.

The Office of Religious Affairs is located in 117 of the King Building. Contact us at 704-687-2344 or by email at swbruce@uncc.edu. Please check the website for the most current information about the registered religious groups, upcoming religious events, and the Inter-Religious Council at www.uncc.edu/relaffairs.

Student IDs

49er ID Cards are required of each UNC Charlotte student to be able to utilize many of the campus services and programs. ID Cards are valid throughout a student's college career during semesters in which he or she is enrolled. Initial ID costs are paid for by student fees. Replacement cards are available for a cost of $10.00. ID Cards are made in the Dining Services/ID Office, located in the Cone University Center, adjacent to the Main Street Market Cafeteria. 704-687-2216. Website: http://www.uncc.edu/auxsrvcs/.

THE UNIVERSITY AND THE COMMUNITY

The University recognizes that its mission reaches beyond the borders of the campus to the surrounding region and the state. The University touches many facets of community life and serves as a catalyst for development of a regional approach to solving problems in education, economic development, transportation, the environment, cultural amenities, and the quality of life. Faculty, staff, and students have made significant impact on the region through research, historic preservation, planning, the arts and literature, and the delivery of government and social services.

The Office of Alumni Affairs

The Office of Alumni Affairs, located in the Alumni House on Highway 49, serves as the liaison between the University and all graduates. The Associate Vice Chancellor for Alumni Affairs is the chief administrative officer, coordinating activities of the Office of Alumni Affairs and carrying out the objectives, goals, and policies of the Alumni Association.

The Alumni Association's primary purpose is to involve alumni in the promotion, advancement, and support of the mission of UNC Charlotte and to develop and stimulate a continuing interest in our Alma Mater by providing opportunities for service, fellowship, and loyalty. A 32-member Board of Governors, elected by the active membership, establishes policy of the Alumni Association and assists in the planning and implementation of projects, events, and programs. Active members of the association are those alumni who contribute to the University or the UNC Charlotte Foundation.

Programs of the Alumni Association include the Alumni Awards Banquet, regional, local, special interest and collegiate chapters, homecoming activities, networking socials, public affairs events, reunions, merchandising opportunities, group travel, athletic support, recognition of outstanding seniors, and sponsorship of the Student Alumni Ambassadors.

The Alumni Office seeks to maintain lifelong contact with all graduates. Graduates are encouraged to become active in the Alumni Association and to notify the Alumni Affairs Office of address changes, employment information, and other significant events, such as marriages, births and Honors. In this way, adequate records can be maintained, and the Alumni Affairs Office can publish news about graduates in the University Magazine. The address is Alumni Affairs Office, Alumni

House, UNC Charlotte, 9201 University City Blvd, Charlotte, NC 28223; telephone 704- 687-2273 or, for those outside Mecklenburg County, 1-800-PIK-UNCC; fax 704-687-3962; email alumni@email.uncc.edu; web page: www.uncc49er.net. A new Alumni Center is in the process of being built on Toby Creek Road. The Alumni Center will house the Office of Alumni Affairs, the Alumni Association, and provide meeting and event space to Alumni, faculty, staff, and students of the University in the near future.

The Ben Craig Center

The Ben Craig Center, located in the University Research Park, is a non-profit incubator associated with UNC Charlotte. Its mission is to foster entrepreneurship in the Charlotte region. The Center accomplishes its mission by combining office infrastructure, consulting services, and a network of business contacts to create a program that accelerates a business' growth.

The Center for Professional and Applied Ethics

The Center for Professional and Applied Ethics offers ethics-related services to professionals who express a need for ethics consultations or education; serves as a focus point where University students can examine the ethical issues embedded in the professions for which they are being trained; and helps develop ethics-related curricular initiatives and research collaborations among interested faculty members. It has 29 Center Faculty Associates who represent the University's major colleges and professional schools and 27 off-campus Advisors who assist with its mission. The Center routinely organizes ethics-related conferences, workshops, and seminars on and off campus.

The Center for Mathematics, Science, and Technology Education

The Center for Mathematics, Science, and Technology Education works closely with the 10 regional school districts, their administrators, and teachers to provide professional development activities in the content areas of mathematics and science for K-12 teachers and in updating and enhancing their methodologies of teaching mathematics and science.

The Charlotte Research Institute (CRI)

The Charlotte Research Institute (CRI) was conceived as a partnership between UNC Charlotte and the corporate and entrepreneurial communities of the region. Ultimately to be housed in 1.2M square feet with one-third of the space currently under construction on 100 acres of the campus, the CRI exists to facilitate collaborative research and to build intellectual capital. The CRI is committed to the development of intellectual capital through global collaborations with industry, government, and academia. The CRI seeks to develop technology-based academic and business partnerships, ranging from consultation to onsite collaborative research. These efforts will attract expertise and resources to the region resulting in the creation of a top-tier interdisciplinary technology research community. Important products of this endeavor include regional cooperation, entrepreneurship, and economic development. The Institute's support of education and research includes its three centers: eBusiness, Optoelectronics and Optical Communications, and Precision Metrology.

The Center for eBusiness Technology is currently focused on the financial industry. The Center is partnering with the Bank of America and Wachovia to solve industry issues pertaining to technology applications. These applications include: information privacy and security, intelligent data analysis, systems integration, information visualization, and is expanding into research in Bioinformatics and Homeland Security. It has the distinction of being a "National Security Agency Center for Information Assurance Education." The Center for eBusiness Technology receives research funding from federal, corporate, and private grants.

The Center for Optoelectronics and Optical Communications includes research areas in design and fabrication of photonic devices, integrated optical circuitry, assembly and packaging of optical systems, optical materials, methods for precision optical metrology, and optical imaging and inverse methods for wavefront synthesis. The center has successfully allied with the Massachusetts Institute of Technology (MIT), Duke University, The Carolinas MicroOptics Triangle, and the North Carolina Photonics Consortium. A respected leader in the discipline, the Center has received grants from the Defense Advancement Research Projects Agency (DARPA) for the past three years.

The Center for Precision Metrology is focused on precision engineering and measurement including research in manufacturing processes and quality assurance for mechanical parts to within a millionth of a meter. New state-of-the-art facilities will include clean rooms and multiple metrology labs. Efforts have included high-speed machine parts, specialized sensors, aerospace industry applications, and have attracted companies such as Caterpillar, Mitutoyo, and Boeing for collaboration. The center also includes a group focused on motorsports and automotive research with collaborative partnerships with area race teams and NASCAR. The Center has been recognized as a National Science Foundation Center of Excellence in New Industry Collaboration and in Nanoscale Science and Engineering.

The Foundation of The University of North Carolina at Charlotte, Inc.

The Foundation of The University of North Carolina at Charlotte, Inc. is a 501(c)(3) public charity, incorporated in 1965 to benefit UNC Charlotte through asset management and fund raising. University employees perform the fund-raising and business functions of the Foundation. In exchange, the Foundation transfers funds

to UNC Charlotte to enhance its teaching, research and service missions.

The Office of Continuing Education, Distance Education/Extension, and Summer Programs

Recognizing that learning must be a lifelong activity, the University provides opportunities for adults to pursue their continuing education through degree-related studies and special non-credit programs. Non-credit short courses, seminars, workshops, and conferences for adults are offered through *Continuing Education*. Specific programs are provided each year for the continuing professional education of accountants, architects, managers in the public and private sectors, engineers, psychotherapists and counselors, teachers and other school personnel, and information specialists. UNC Charlotte also offers special lectures and forums in the arts, sciences, humanities, and public policy for the personal enrichment of all interested citizens.

Through *Distance Education/Extension*, courses for academic credit are offered at off-campus sites to serve citizens who live beyond easy commuting distance from the campus. Options for delivery include sending a UNC Charlotte faculty member to an off-campus location to teach a course in person, using one of two state-wide interactive video networks to link a UNC Charlotte faculty member on the campus in Charlotte with students attending class at remote locations throughout the state, and transmitting instruction via the Internet. In addition, the University has the ability to deliver educational programming over Cable Channel 22, which is the channel reserved for the University by the local cable service.

During the summer, the office schedules a variety of credit and non-credit programs, including academic enrichment camps for youth, on the campus and at approved off-campus sites. Contact the Office of Continuing Education, Distance Education/Extension, and Summer Programs at 704-687 2424 or visit its website online at www.ceesp.uncc.edu for specific information about the programs offered.

The Office of University Development

Known traditionally as a "state-supported institution," UNC Charlotte is more accurately a "state-assisted institution," as the University depends on non-state resources for more than half of its operating needs. Philanthropy is critically important, providing the critical margin of excellence so that the University can fulfill its threefold mission of education, research, and public service.

The Office of University Development plans and implements the private fund-raising and related efforts of the University and the Foundation of The University of North Carolina at Charlotte, Inc. Its functions include annual giving, gift planning, major gifts, corporate and foundation relations, gift processing, alumni/donor records, research, donor stewardship and campus-wide development services.

The Office of Public Relations

The Office of Public Relations, located in the Reese Building, is the official communications channel through which the University disseminates information to its various publics. The Office has three major functions: (1) external media relations; (2) internal communications; and (3) official University publications that are distributed to off campus audiences. The Office works with media outlets throughout the country on news and feature coverage about University programs and its people. Additionally, the staff writes and distributes tip sheets and news releases about campus activities, as well as faculty and student achievements. The Office produces a weekly newsletter, Campus News, that informs faculty and staff about campus activities; publishes the official university magazine, which is distributed to alumni and friends of UNC Charlotte; and provides editing and design assistance in printing official publications for University departments.

The UNC Charlotte Urban Institute

The UNC Charlotte Urban Institute develops and supports programs that give impetus to the University's urban mission. The Institute is a catalyst for projects designed to meet the applied research needs of urban and developing areas of the Charlotte Metropolitan region. It also provides administrative and technical support to organizations involved with issues of an urbanizing society. Projects are initiated by members of the faculty, community clients or the Institute staff and focus on a broad spectrum of urban topics (e.g., local government, the environment, land use, business assistance and economic development.) Students may become involved in Institute projects as part-time research assistants or interviewers, or they may become involved with the Institute in conjunction with course work or degree requirements by writing term papers, graduate theses, or completing internships. The Institute's program areas are described as follows.

Open Space Institute of the Carolinas is a membership organization open to agencies and individuals who have an interest in the conservation of land in the central piedmont region of the Carolinas. The program maintains an information base of conservation initiatives in the region and implements research and educational activities relating to broadening the community's understanding of the importance of conservation efforts.

Community Research and Service conducts needs assessments and public opinion surveys of both target and general populations focusing on issues of concern to local, regional, and national clients. The program also provides support to government and community agencies in the planning and implementation of special projects and strategic planning activities.

Land Use and Environmental Planning conducts research for and provides planning services to county and municipal governments and to businesses and non-profit organizations in the central piedmont region of the Carolinas. LUEP operates the Open Space Institute, which works collaboratively with regional land conservation organizations to define and achieve a shared regional open space vision, through education, research and planning. This division maintains and provides access to a rich set of regional information resources in support of land use, open space and environmental planning.

Evaluation Research provides research and evaluation services focusing on human service programs. Impartial, third-party program evaluation is provided to decision makers in government and private organizations for use in responsible financial management and long-term decision making regarding program policy and funding issues.

Technology Services and Training is a division specializing in the application of computer technology to develop high-payoff solutions for public-sector clients. A major on-going project involves providing software support and training for a statewide computerized school bus routing project called Transportation Information Management Systems (TIMS). Other projects include database design and desktop mapping projects for economic development, social service agencies, and healthcare providers; conference planning and hosting; and redistricting for school systems.

University Regulation Of Student Conduct

As students willingly accept the benefits of membership in the UNC Charlotte academic community, they acquire obligations to observe and uphold the principles and standards that define the terms of the UNC Charlotte community.

The University of North Carolina at Charlotte has enacted two codes governing student conduct. The University has also enacted a program for the prevention of the use of illegal drugs and alcohol abuse. All UNC Charlotte students are obligated to be familiar with these codes and to conduct themselves in accordance with the standards set forth.

THE UNC CHARLOTTE CODE OF STUDENT ACADEMIC INTEGRITY governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. The following conduct is prohibited in that Code as violating those standards:

- **A. Cheating.** .Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices in any academic exercise. This definition includes unauthorized communication of information during an academic exercise.
- **B. Fabrication and Falsification.** Intentional and unauthorized alteration or invention of any information or citation in an academic exercise. Falsification is a matter of altering information, while fabrication is a matter of inventing or counterfeiting information for use in any academic exercise.
- **C. Multiple Submission.** The submission of substantial portions of the same academic work (including oral reports) for credit more than once without authorization.
- **D. Plagiarism.** Intentionally or knowingly presenting the work of another as one's own (i.e., without proper acknowledgment of the source). The sole exception to the requirement of acknowledging sources is when the ideas, information, etc., are common knowledge.
- **E. Abuse of Academic Materials.** Intentionally or knowingly destroying, stealing, or making inaccessible library or other academic resource material.
- **F. Complicity in Academic Dishonesty.** Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

A full explanation of these definitions, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Academic Integrity. This Code may be modified from time to time. Students are advised to contact the Office of the Dean of Students or go to www.legal.uncc.edu/policies/ps-105.html to ensure they consult the most recent edition.

THE UNC CHARLOTTE CODE OF STUDENT RESPONSIBILITY

Conduct Rules and Regulations

The following conduct, or an attempt to engage in the following conduct, is subject to disciplinary action: **[Note: Letters J, P, and U have been intentionally omitted for continuity in record-keeping.]**

- **A.** (1) Inflicting physical injury upon a person; (2) placing a person in fear of or at risk of imminent physical injury or danger; (3) committing sexual invasion, sexual assault, sexual misconduct, or sexual harassment as defined herein; (4) inflicting severe mental or emotional distress upon a person through a course of conduct involving repeated abuse or disparagement; (5) engaging in "fighting words" harassment as that term is defined in Policy Statement #95. The full text of this policy is available online or in the Office of the Dean of Students.
- **B.** Using, possessing, or storing any weapon, dangerous chemical, or explosive without authorization.
- **C.** Initiating or causing to be initiated any false report, warning, or threat of fire, explosion, or other emergency.
- **D.** Interfering with normal University activities including, but not limited to, teaching, studying, research, the expression of ideas, University administration, speeches and other public or private events, and fire, police or other emergency services. Acts prohibited by this rule include, but are not limited to, those acts prohibited in University Policy Statement #58, "Interference with University Operations," which prohibits student action taken "with intent to obstruct or disrupt any normal operation or function of the University," and Policy Statement #96, "Conduct at Speech Events," which prohibits certain disruptive activities at speech events on campus. Full texts of both policies are available online or in the Office of the Dean of Students.
- **E.** Knowingly violating the terms of any disciplinary sanction imposed in accordance with this Code.

F. Possessing any controlled substance or drug paraphernalia, or manufacturing, selling or delivering any controlled substance or possessing with intent to manufacture, sell or deliver, any controlled substance. Minimum penalties and certain other requirements apply where controlled substance offenses are at issue, pursuant to University Policy Statement #87, "Program to Prevent Use of Illegal Drugs and Alcohol Abuse." That policy is available online or in the Office of the Dean of Students.

G. Setting fires, or misusing or damaging fire safety equipment or elevators.

H. Furnishing false information to the University or a University official; misrepresenting or concealing one's organizational affiliation(s) or sponsorship(s) for the purpose of enticing another person into joining or participating in a group or organization.

I. Forgery, unauthorized alteration, or unauthorized use or misuse of any document or instrument of identification (ID); displaying or using an ID that is not one's own or is fictitious, canceled, revoked, suspended, or altered; counterfeiting, loaning, or selling an ID to another person not entitled thereto.

K. Theft or attempted theft of property or services, the unauthorized use or access to private or confidential information in any medium, possessing stolen property; or possessing property that is not your own without owner authorization.

L. Destroying or damaging the property of others or University property.

M. Failing to comply with the reasonable directions of University officials, including but not limited to campus police officers or Residence Life Staff, acting in performance of their duties.

N. Violating published University regulations or policies, as approved by the Vice Chancellor for Student Affairs. Such regulations or policies include but are not limited to the residence hall contract, as well as regulations relating to entry and use of University facilities, use of vehicles and amplifying equipment, campus demonstrations, and misuse of identification cards.

O. Possessing, consuming, or distributing alcoholic beverages without University authorization including but not limited to possessing or consuming alcoholic beverages by students below the legal minimum age; displaying or consumption of alcoholic beverages in campus residences by students less than twenty-one years of age; furnishing, or selling any alcoholic beverages to any person not of sufficient legal age to possess or consume such alcoholic beverage; failing to abide by the provisions of an Acknowledgment of Responsibility for Service of Alcoholic Beverages form; or making any sale of any alcoholic beverage on the University campus. (The full text of University Policy Statement #57, "Alcoholic Beverages," is available online or in the Office of the Dean of Students.)

Q. Being present in or using University premises, facilities, or property without University authorization.

R. Using or possessing fireworks on University premises or at University activities without University authorization.

S. Engaging in conduct that disrupts or interferes with the normal functions of a class, or engaging in disorderly conduct such as fighting, threatening behavior, public disturbance, or drunk and disorderly conduct.

T. Causing or permitting a person, in relation to membership in a society, club or similar organized group (whether or not recognized by the University), to participate in any activity that subjects that person or others to unnecessary risks of physical injury or extreme mental distress, whether or not such person has consented to participation in the activity. The full text of University Policy Statement #83, "Hazing," is available online or in the Office of the Dean of Students.

V. Engaging in computer abuse, including but not limited to: unauthorized use of or tampering with the operation of any University computer system including hardware and software; inspecting, modifying, or copying programs or data in University owned or controlled computing facilities without authorization or for purposes other than that for which authorization was given; disrupting or interfering with legitimate use of University computing systems by authorized users; using or copying any University software except as permitted under license; using University computing facilities to use or copy any software except as permitted under license; use of computers in University computer labs that is not related to UNC Charlotte course- and degree-related work; or violating University Policies # 66, 67, 10, 20, and 8 on computer and software use. (The full text of University Policy Statements #66, "Responsible Use of University Computing and Electronic Communication Resources," #67, "Proprietary Software," #10, Network Security, #20, Electronic Communication Systems, or #8, World Wide Web, are available online or in the Office of the Dean of Students.)

W. Gambling for money or other things of value except as allowed by law. Prohibited gambling includes, but is not limited to, betting on, wagering on, or selling pools on any University athletic event; possessing any card, book, or

other device for registering bets, or bookmaking in connection with betting.

A full explanation of prohibited conduct, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Responsibility. This Code may be modified from time to time. Students are advised to contact the Office of the Dean of Students or go to www.legal.uncc.edu/policies/ps-104.html to ensure they consult the most recent edition.

PROGRAM TO PREVENT USE OF ILLEGAL DRUGS AND ALCOHOL ABUSE (POLICY #87)

General. In keeping with efforts to maintain an environment that supports and encourages the pursuit and dissemination of knowledge, it is the policy of The University of North Carolina at Charlotte to consider the use of illegal drugs or alcohol abuse by students, faculty and staff or by others on premises under University control to be unacceptable conduct that adversely affects the educational environment.

Further, the University considers a sound awareness, education, and training program indispensable in combating illegal use of drugs and alcohol abuse, both as a preventive measure and as a remedy. The scope of the University program addresses the awareness needs of students, faculty, administrators, and other staff members and includes the following minimum components.

- The health hazards associated with the use of illegal drugs and with alcohol alone.
- The incompatibility of the use of illegal drugs or abuse of alcohol with maximum achievement of personal, social, and educational goals.
- The potential legal consequences (including both criminal law and University discipline) of illegal drug abuse.
- The effective use of available campus and community resources in dealing with illegal drug abuse and alcohol abuse problems.

Responsibilities: It is the responsibility of all students, faculty, and staff to conduct themselves in such a way as to contribute to an environment free of illegal drug use and abuse of alcohol. Also students, faculty, and staff are responsible, as citizens, for knowing about and complying with the provisions of North Carolina law that make it a crime to possess, sell, deliver, or manufacture those drugs designated collectively as "controlled substances" in Article 5 of Chapter 90 of the North Carolina General Statutes.

The Health Educator and the Assistant Director of Personnel for Training and Employee Relations are responsible for designing and carrying out a comprehensive program of awareness education and training for students, faculty, and staff on the subject of preventing the illegal use of drugs and abuse of alcohol. The Substance Abuse Prevention Committee will provide guidance and support to their efforts, which will be coordinated through the Vice Chancellor for Student Affairs as Coordinator of Drug Education.

The Director of the Counseling Center shall, within the limits of available resources, provide services and programs to students, faculty, and staff seeking assistance with problems of illegal drug use or alcohol abuse. Counseling Center services to faculty and staff are available under the University's Employee Assistance Program (EAP). In cases where the treatment needs of such students, faculty, and staff exceed the resources of the Center, the Center shall provide referral to appropriate facilities in the community.

Collaboration with Community Resources. The University's program emphasizes collaboration with local resources such as the Charlotte Drug Education Center, Chemical Dependency Center of Charlotte-Mecklenburg, Mecklenburg County Substance Abuse Services, McLeod Center, Alcoholics Anonymous, Narcotics Anonymous, Al-Anon, Nar-Anon, etc. To this end, the University shall participate in the Mecklenburg Coalition on Substance Abuse and will work with local advisory boards to further collaborate between the University and the Charlotte Community.

Education and Prevention Activities. The University's institution-wide awareness, education, and training efforts stress prevention. The goal of these efforts is (1) to encourage non-users of illegal drugs and alcohol to continue to be non-users, (2) to encourage users of alcohol to do so responsibly, and (3) to encourage users of illegal drugs to stop.

Illegal Use of Drugs and Abuse of Alcohol. The use of illegal drugs and the abuse of alcohol are considered by the University to be problems that can be overcome. Therefore, the educational and rehabilitative services mentioned above are available on a confidential basis. However, the possession, sale, delivery, or manufacture of illegal drugs will not be tolerated on campus or off campus in the event that the interests of the University may be affected. The University will cooperate fully with law enforcement agencies and will apply appropriate disciplinary processes should a student, faculty member, or staff member violate criminal statues with regard to illegal drugs. Violations subject a student, faculty member, or staff member to prosecution and punishment by civil authorities **and** to disciplinary action by the University. It does not constitute "double jeopardy" for the University to initiate its own disciplinary proceedings for the same offense when the alleged conduct is deemed to affect the interests of the University. Employees convicted of any criminal drug offense occurring in the workplace must notify the University by informing the appropriate Vice Chancellor's office no later than five (5) days after conviction. Disciplinary action and/or

participation in a drug rehabilitation/education program as a result of campus proceedings must commence within 30 days of notice of conviction.

Disciplinary procedural safeguards applicable to one's status as a member of the University community will be followed. These are described in the following documents:

Status	Document
Students	*UNC Charlotte Code of Student Responsibility*
SPA Staff	*State Personnel Manual*
EPA Staff	EPA Non-Faculty Personnel Policy
Faculty	Section 603 of the *UNC Code* and *Section 6* of *UNC Charlotte Tenure Document*

Minimum sanctions described below in the Policy would also apply to employees who do not fall in any of the categories above. In the event a student is also an employee of the University, the minimum sanctions for employment as well as student status would apply.

The use of illegal drugs may lead to a variety of sanctions, from written warnings with probationary status to expulsion from enrollment or discharge from employment. However, in accordance with the Policy on Illegal Drugs adopted by the Board of Governors from the University of North Carolina, the following minimum penalties shall be imposed for the particular offenses described.

Trafficking in Illegal Drugs

1. For the illegal manufacture, sale, or delivery, or possession with intent to manufacture, sell, or deliver, of any controlled substance, identified in Schedule I, N.C. General Statutes 90-89, or Schedule II, N.C. General Statutes 90-90 (including, but not limited to, heroin, mescaline, lysergic acid diethylamide, opium, cocaine, amphetamine, and methaqualine), any student shall be expelled and any faculty member or staff member shall be discharged.
2. For a first offense involving the illegal manufacture, sale, or delivery, or possession with intent to manufacture, sell, or deliver, of any controlled substance identified in Schedules III through VI; N.C. General Statutes 90-91 through 90-94, (including, but not limited to, marijuana, pentobarbital, and codeine) the minimum penalty shall be suspension from enrollment or from employment for a period of at least one semester or its equivalent. For a second offense, any student shall be expelled and any faculty member or staff member shall be discharged.

Illegal Possession of Drugs

1. For a first offense involving the illegal possession of any controlled substance identified in Schedule I, N.C. General Statutes 90-89, or Schedule II, N.C. General Statutes 90-90, the minimum penalty shall be suspension from enrollment or from employment for a period of at least one semester or its equivalent.
2. For a first offense involving the illegal possession of controlled substance identified in Schedule III through VI, N.C. General Statutes 90-91 through 90-94, the minimum penalty shall be probation, for a period to be determined on a case-by-case basis. A person on probation must agree to participate in a drug education and counseling program, consent to regular drug testing, and accept such other conditions and restrictions, including a program of community service, as the Chancellor or the Chancellor's designee deems appropriate. Refusal or failure to abide by the terms of probation shall result in suspension from enrollment or from employment for any unexpired balance of the prescribed period of probation.
3. For second or other subsequent offenses involving the illegal possession of controlled substances, progressively more severe penalties shall be imposed, including expulsion of students and discharge of faculty members or staff members.

Suspension for a Minimum Period of "One Semester or its Equivalent." This logically may be interpreted to mean, in the case of a student, forfeiture of at least one full semester of academic credit or attendance; this may be accomplished either (1) by suspending the student for the unexpired balance or the semester during which guilt is determined, with attendant loss of all academic credit for that semester, or (2) by placing the student on probation for the unexpired balance of the semester during which guilt is determined and suspending the student for the duration of the next succeeding semester; in the case of a faculty member or staff member, it may be interpreted to mean forfeiture of pay for a period of 18 weeks. Since the current State Personnel Act specifies that disciplinary suspensions cannot exceed three days, offense for which an 18-week minimum suspension is required by the Board of Governor's policy will result in discharge of an employee subject to the State Personnel Act.

Suspension Pending Final Disposition. When a student, faculty member, or staff member has been charged by the University with a violation of policies concerning illegal drugs, he or she may be suspended from enrollment or employment before initiation or completion of regular disciplinary proceedings if, assuming the truth of the charges, the Chancellor or, in the Chancellor's absence, the Chancellor's designee concludes that the person's continued presence within the University community would constitute a clear and immediate danger to the health or welfare or other members of the University community; provided, that if such a suspension is imposed, an appropriate hearing of the charges against the suspended person shall be held as promptly as possible thereafter.

References. The use of alcoholic beverages on the University campus is regulated by Policy Statement #57, "Policy on Alcoholic Beverages." Policy Statement #62, "Employee Assistance Program," establishes a free employee assistance service as part of the University Counseling Center. ..

IMMUNIZATION REQUIREMENTS

North Carolina state law requires proof of immunizations to protect you and others while you are in attendance. Under North Carolina regulations, a student must be dropped from classes if the immunization requirements are not met within thirty days of the start of classes. An *Immunizations Form* is available to download online at www.uncc.edu/health_svcs. It is permissible to attach official copies (i.e., signed or stamped by a physician, health department, etc.) of any records that verify your immunizations. You may obtain any needed immunizations from your private physician, local health department, or UNC Charlotte's Student Health Services.

NOTES: A physical is not required for admission, only documentation of required immunizations. Also, immunization records, including those attached to high school or other transcripts, which are mailed to other offices on campus, are not transferred to Student Health Services.

The following students are exempt from these requirements: (1) Students who attend classes only in the evening (i.e., after 3:30 p.m.); (2) Students who attend classes off campus only; and (3) Students who enroll in no more than four hours per semester. Medical and religious exemptions can be requested through Student Health Services.

Be sure to include your name, student identification number, and date of birth on each page. Questions and forms should be directed to:

UNC Charlotte Student Health Service
Attn: Immunizations
9201 University City Blvd
Charlotte, NC 28223

A letter indicating your compliance or additional immunization requirements will be sent to you upon receipt of your records.

Required Immunizations

A. For students 17 years of age and younger.

3 DTP (Diphtheria, Tetanus, Pertussis) or 3 Td (Tetanus-diphtheria) doses; 1 Td dose must be within the last ten years.
3 Polio (oral) doses.
2* MEASLES (Rubella) doses on or after the first birthday.
1** RUBELLA dose on or after first birthday.
1 MUMPS dose on or after first birthday.

B. For students born after December 31, 1956, to 18 years of age.

3 DTP or 3 Td doses; one Td dose must be within the last ten years.
2* MEASLES (Rubella) doses on or after the first birthday.
1** RUBELLA dose on or after first birthday.
1 MUMPS dose on or after first birthday.

C. For students born prior to January 1, 1957, through age 49.

Primary series of 3 DTP or 3 Td doses - one dose must be within the last ten years.
A documented Td BOOSTER within the past ten years will be accepted as evidence of the initial series.
1** RUBELLA dose.

D. For students 50 years of age and older.

Primary series of 3 DTP or 3 Td doses - one dose must be within the last ten years.
A documented Td BOOSTER within the past ten years will be accepted as evidence of the initial series.

E. For all International Students

Tuberculin Skin Test (PPD) within the 12 months preceding classes.
Chest x-ray if test is positive.

* History of physician-diagnosed measles disease OR laboratory proof of immunity is acceptable. Must repeat measles vaccine if received even one day prior to first birthday.
** ONLY laboratory proof of immunity to rubella is acceptable; physician-diagnosed rubella disease is not acceptable.

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Bobby A. Prince, B.B.A.
Director of Major Gifts

Christine E. McLeod, B.A., M.A., J.D.
Director of Corporate and Foundation Relations

Student Affairs

Charles F. Lynch, B.A., M.Ed.
Vice Chancellor

Allan P. Blattner, B.A., M.Ed.
Associate Director, Staff and Student Development
Housing and Residence Life

Matthew T. Boyer, B.S., M.S.
Associate Director, Intramural Sports and Special Events
Intramural and Recreational Services

Anthony D. Carter, B.A., M.A.
Director, Financial Aid

Theodore B. Coy
Associate Director, Operations
Recreational Facilities Management

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Associate Vice Chancellor

Rosemary E. Ferguson, B.A., M.P.H.
Associate Director and Health Educator
Student Health Services

Frank Fleming, B.S., M.Ed.
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Robert L. Jones, M.D.
Medical Director, Student Health Services

Marcia Kennard Kiessling, B.A., M.S.
Director, Office of Student Activities

Arthur A. Kohn, A.B., B.A., M.Ed.
Director, Venture

Jason A. Levy, B.S., M.S.
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Cone University Center

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Office of Student Activities

Rebecca MacNair-Semands, B.S., M.S., Ph.D.
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James A. Mallinson, Jr., B.A., M.A.
Director, Student Health Services

Marie McDaniel, B.S.
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THE GRADUATE FACULTY

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Linwood Cousins (2000), *Interim Chair, Department of Social Work and Associate Professor of Social Work*, B.S.W., M.S.W., Virginia Commonwealth University; M.A., Ph.D., University of Michigan

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Correspondence Directory

If, after reading this *Catalog*, you have further questions or specific inquiries about the programs of, or admission to, The University of North Carolina at Charlotte, please look below to find the proper office to contact. Address correspondence to any of the offices in care of:

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9201 University City Boulevard
Charlotte, North Carolina 28223-0001

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College of
Architecture.....704-687-4841
Arts & Sciences.....704-687-4303
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Health Services
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Inclement Weather.....704-687-2877

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Our data shows that 51% of the full-time new freshmen who entered UNC Charlotte in Fall 1998 have received a baccalaureate from this institution or another UNC institution as of Fall 2004. In addition, another 7% were enrolled at this or another UNC institution in pursuit of their baccalaureate degree as of Fall 2004. This information is provided pursuant to requirements of the Student-Right-to-Know and Campus Security Act of 1990.

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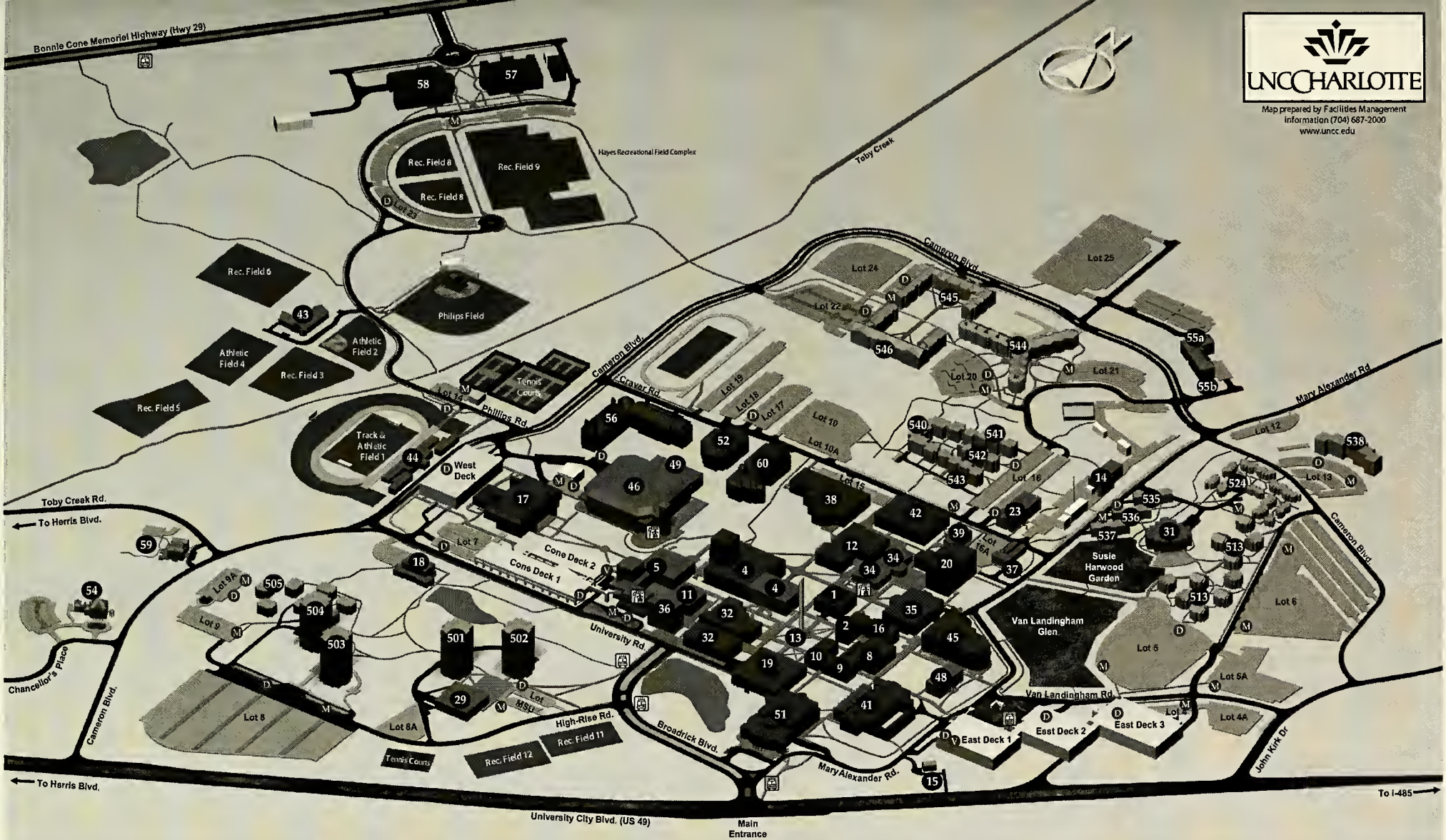

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  - Susie Harwood Garden
  - Van Landingham Glen
- 43 Wachovia Field House

Campus Housing

- 535 Cedar Hall
- 546 Cypress Hall
- 543 Elm Hall
- 538 Hawthorn Hall
- 536 Hickory Hall
- 504 Holshouser Hall
- 505 Hunt Village
- 542 Maple Hall
- 513 Martin Village
- 501 Moore Hall
- 540 Oak Hall
- 524 Phase III
- 541 Pine Hall
- 502 Sanford Hall
- 503 Scott Hall
- 545 Squires Hall
- 537 Sycamore Hall
- 544 Witherspoon Hall

Parking Areas

Resident, Commuter & F/S

- Lot 5
- Lot 5A
- Lot 6
- Lot 8
- Lot 10
- Lot 12
- Lot 14
- Lot 17
- Lot 18
- Lot 19
- Lot 23
- Lot 25
- West Deck

Resident & F/S

- Lot 8A
- Lot 9
- Lot 9A
- Lot 13
- Lot 16 *
- Lot 20
- Lot 21
- Lot 22
- Lot 24
- Lot MSU

* Note: No F/S in this lot except in marked spaces

Commuter & F/S

- Lot 4
- Lot 4A
- Lot 7
- East Deck 2
- East Deck 3

Faculty & Staff

- Lot 10A
- Lot 11
- Lot 11A
- Lot 15
- Cone Deck 1
- Cone Deck 2
- East Deck 1

- ATM
- CATS Bus Stop Route 29
- Shuttle Bus Stop Route 249
- Disabled Parking
- Meter Parking
- Visitor Parking